

## V. Lucerne LSR

### A. General Description of LSR

This portion of the document describes the vegetation, wildlife, aquatic resources and human uses associated with this LSR.

#### 1. Vegetation

This section describes the current condition of vegetation groups within the Lucerne LSR. Data was derived from modeling (Appendix 2 in the Forest-Wide document). It should be noted that site-specific information regarding vegetation structure and distribution will need to be updated as restoration projects are initiated. The vegetation layer derived for this analysis serves as a starting point only.

Additional vegetation information can be found in the Chelan Basin Watershed Assessment (on file at the Chelan RD).

##### a) Vegetation Group Information Unique to this LSR

###### (1) Dry Forest Group and Grassland/Shrubland

Seventy-five percent (6,446 acres) of the Lucerne LSR consists of the dry forest group. Within this group, 70 percent (4,509 acres) of the Lucerne LSR is mapped as high density and 26 percent (2,210 acres) is mapped as created openings. The actual amount of created openings in this group is likely less because of the inability of the modeling effort to distinguish between created (fire or human-caused) openings in forest environments and inherent openings (scattered forest, grassland/shrubland). Therefore, the amount of grassland/shrubland mapped (191 acres) is underestimated, while created openings are overestimated. For example, the modeled vegetation map shows Domke Ridge as being scattered created openings interspersed with successional advanced structure. This area actually consists of rock-outcroppings and grassland/shrubland adjacent to small forest patches. In addition, the area to the north and west of Domke Lake (Cedar Flats) is wrongly mapped as dry forest. This area is dominated by *Thuja plicata* and *Oplopanax horridum* which places it in the wet forest group.

Within this forest group, the ponderosa pine series is limited within the LSR. In some locations, ponderosa pine exists as the sole overstory dominant, but more often is co-dominant with Douglas-fir. Shrub composition in the understory is dominated almost exclusively by *Purshia tridentata* (Chelan Basin Watershed Assessment, on file at the Chelan RD). Grasses include *Agropyron spicatum*, *Calamagrostis rubescens*, *Carex geyeri*, and *Poa wheeleri*, and forbs present include *Achillea millefolium*, *Lupinus serotinus*, *Balsamorhiza sagittata*, and *Lomatium* spp. (Chelan Basin Watershed Assessment, on file at the Chelan RD).

Grassland or shrubland vegetation is similar to *P. tridentata* or *Agropyron spicatum* habitat types described by Daubenmire (1988).

###### (2) Mesic Forest Sites (Embedded within the Dry Forest Group)

Mesic sites were not mapped within the Lucerne LSR due to the limitations of the modeling process. In general, mesic sites would occur on steep (>40 percent slopes), northerly aspects, riparian areas, or moist benches within the dry forest group (see Vegetative Landscape section,

Chapter II in the Forest-wide Assessment). It will be important for these sites to be identified through restoration projects since suitable spotted owl habitat may need to be promoted or maintained within a 1.8-mile radius of spotted owl circles on mesic sites. Mesic sites outside of these circles (see wildlife section) would be managed similarly to dry forest sites, but different species compositions and structures would direct specific management strategies.

Mesic sites are typically within the Douglas-fir series and include the more moist plant associations. Ponderosa pine may be present, but only as remnants from early seral establishment. The understory tends to be more lush, often with a higher shrub component than in the more dry plant associations within the Douglas-fir and ponderosa series. Understory species include *Symphoricarpos albus*, *Arctostaphylos uva-ursi*, *Spiraea betulifolia*, *Pachistima myrsinites*, *Shepherdia canadensis*, *Carex concinnoides*, *Festuca occidentalis*, *Carex geyeri*, and *Calamagrostis rubescens* (Chelan Basin Watershed Assessment and 25 Mile/First Creek Watershed Assessment, on file at the Chelan RD).

### (3) Moist Grand Fir Group

A small portion (one percent, 118 acres) of the Lucerne LSR consists of the moist grand fir group. The moist grand fir group does not exist within the Slide Peak LSR (Forest-wide Assessment, Appendix 4). Discussing the percentages of various vegetative structures is rather meaningless because of the small acreage present. Within the Lucerne LSR, moist grand fir is restricted to north aspects.

As a community dominant, grand fir becomes less important north of the Entiat River (see Vegetative Landscape, Chapter II in the Forest-Wide Assessment). Where grand fir does form the climax communities, it is restricted to relatively narrow bands between the dry forest group and the subalpine fir or wet forest group.

Understory composition is graminoid and forb dominated with such species as *Calamagrostis rubescens*, *Spiraea betulifolia*, *Rosa gymnocarpium*, *Linnaea borealis*, and *Chimaphila umbellata* (Chelan Basin Watershed Assessment, on file at the Chelan RD).

### (4) Wet Forest Group

Five percent (459 acres) of the Lucerne LSR consists of the wet forest group. The silver fir series is the most prominent component of this group within the LSR (Wenatchee National Forest, Ecology Plot Database). Wet forest communities are most prevalent in the northwestern portion of the LSR at the headwaters of Lightning Creek. The majority (258 acres) of this group is currently mapped as layered or mature. Created openings account for 158 acres of this group. These openings are the result of avalanches, but the modeling effort was not able to determine their origin. In addition, the total acreage of this group is likely underestimated partly because of the mapping error near Domke Lake (see Dry Forest discussion above) and partly because riparian areas are likely to support this vegetation type.

Overstory composition throughout this forest group is variable, consisting largely of silver fir. However, western hemlock, western white pine, Douglas-fir, mountain hemlock, Engelmann spruce, and lodgepole pine are also represented (Chelan Basin Watershed Assessment, on file at the Chelan RD). Understory composition is largely dominated by shrub species such as *Vaccinium membranaceum*, *Clintonia uniflora*, *Pyrola asarifolia*, *Linnaea borealis*, and *Adenocaulon bicolor* (Chelan Basin Watershed Assessment, on file at the Chelan RD).

### (5) Subalpine Fir Series

Seven percent (606 acres) of the Lucerne LSR consists of the subalpine fir series. This series is restricted to the highest elevations at the headwaters of Lightning Creek. Most of this series is mapped as layered or mature. Created openings are primarily the result of avalanches.

Subalpine fir is the most widespread species within the overstory. Common seral dominants include lodgepole pine and Engelmann spruce, but western white pine, mountain hemlock, and whitebark pine may also be present, particularly in ecotones between forest types. Understory composition is typically shrub dominated and common species include *Vaccinium myrtillus*, *Penstemon procerus*, *Lupinus latifolius*, *Festuca viridula*, and *Rubus lasiococcus* (Chelan Basin Watershed Assessment, on file at the Chelan RD).

(6) Whitebark Pine/Subalpine Larch Group and High Elevation Nonforest Types

The remainder of the forest vegetation within the Lucerne LSR consists of high elevation whitebark pine and subalpine larch, with the majority being subalpine larch. Approximately 2 percent (144 acres) of the LSR is occupied by this forest group (Appendix 4) and 100 percent of this group consists of structures other than created openings. It should be noted that the amount and location of this forest group is underestimated. The vegetation modeling used (see Vegetative Landscape, Chapter II, Forest-Wide Assessment) was not able to provide a highly accurate distinction between open forest types and rock or upland meadows. Therefore, it is likely that less upland meadow and more of this forest group is present within the LSR. Site-specific analyses tied to restoration projects will be needed in order to rectify this discrepancy.

Information regarding species composition and specific structure is lacking at this time.

(7) Non-Forest Vegetation

Ten percent (871 acres) of the Lucerne LSR was mapped as non-forest vegetation (Appendix 4 of the Forest-wide Assessment) which includes 191 acres of grassland/shrubland discussed above. Thirty-one percent (272 acres) of this type is occupied by Domke Lake. Brushfields (124 acres) and deciduous forest (105 acres) were mapped in the northern portion of the LSR. No information exists to verify the accuracy of these mapping units. Upland meadows accounted for 106 acres of non-forest vegetation. Upland meadows were mapped within the whitebark pine/subalpine larch group. A small amount (72 acres) of wet meadows were mapped in scattered locations including Domke Ridge and in the upper reaches of Lightning Creek.

(8) Species with Special Status

Within the Lucerne LSR, there is potential habitat for a number of special status species, but few surveys have been carried out to determine presence or absence. Surveys should be carried out in conjunction with restoration projects, as well as surveys independent of other activities. It is important that species ranges are known so that better estimates of species viability can be assessed. In addition, little is known about most special status species habitat and biological requirements, and inventories provide a first and necessary step in obtaining this information.

There are no known Forest Service sensitive (see Late-Successional Associated Plant Species, Chapter IV, Forest-wide Assessment) species within the Lucerne LSR (Appendix 6, Forest-wide Assessment). Several species, however, are suspected to occur within the LSR. *Agoseris elata*, *Astragalus arrectus*, *Botrychium* spp., *Cypripedium fasciculatum*, *Epipactis gigantea*, *Githopsis specularioides*, *Pellaea brachyptera*, *Spiranthes porrifolia*, and *Orobancha pinorum*. Several of these species occur across Lake Chelan from the LSR.

*Cypripedium fasciculatum* has been the focus of a number of research and monitoring projects over the past four years on the Leavenworth Ranger District. Project include pollination ecology, seed dispersal, habitat characteristics, seed germination, electrophoresis, and fire ecology.

Habitat information regarding *Botrychium* species has been collected and summarized in a number of publications, as well as local information specific to habitats on the Lake Wenatchee Ranger District. *Botrychium* species may be present near Domke Lake.

*Orobanche pinorum* is an achlorophyllous plant and obligate root parasite of *Holodiscus discolor*. Aerial stems are annual developing from a haustorial tuberacle. From each stem, 50-150 flowers are produced in late June or early July. The species is facultatively autogamous and it apparently only reproduces by seed (Ellis et al. 1994).

*Orobanche pinorum* is often found in *Pseudotsuga menziesii* dry forest associations with incomplete upper canopies between 460 and 1220 meters in elevation (Harrod et al. in press). These sites have scattered herb and low shrub understories, and a tall shrub layer dominated by its host, *H. discolor*.

There are no known survey and manage plant species within the Lucerne LSR. There are several vascular plant species suspected to occur in the LSR, but non-vascular plants are simply unknown (Appendix 7, Table ?). The ROD provides standards and guidelines for survey and manage species, and these should be addressed within the Lucerne LSR when restoration projects are implemented.

Few if any surveys have been carried out for non-vascular and vascular plants. Surveys should be a priority project within the Lucerne LSR.

#### (9) Noxious Weeds

The Lucerne LSR has not been formally surveyed for noxious weeds species. *Centaurea diffusa* is known to occur at Lucerne, just outside of the LSR, and *Myriophyllum spicatum* is present in Domke Lake (Mallory Lenz, Chelan RD, personal communication). Surveys for species presence and extent should be completed in order to develop a noxious management plan for this LSR (refer to Harrod 1994).

## 2. Late Successional Associated Wildlife Species

### a) Introduction

In this chapter, information is presented about wildlife species that are associated with the late-successional habitats that are either present or would be managed for in the Lucerne LSR. A total of 80 species have been identified as being associated with these kinds of forest conditions and are present, unknown or suspected to occur within the LSR. The list of these species can be found in Appendix 27.

In addition to consideration for the groups of species associated with the various kinds of late-successional forests, individual species assessments were also conducted. These assessments were completed for all threatened, endangered, sensitive, species of concern (USFWS), management indicator, protection and buffer, and survey and manage species. Collectively this group of species is referred to as species of special status. What information is available about the status of these species within the Lucerne LSR is summarized in this chapter. However, relatively little is known about a number of them.

Inventories or surveys have been conducted for only a few of the wildlife species as shown in Appendix 27. The most extensive of these were for mule deer and gray wolves. Northern

spotted owl inventories have been conducted over about 10% of the suitable habitat within the LSR.

b) Late Successional Species By Habitat Type

(1) Dry Forests

About 6,446 acres (75%) of the Lucerne LSR is composed of the dry forest vegetation group. Fire climax ponderosa pine forests historically dominated these areas and 49 wildlife species are associated with these forests.

Currently, 4,509 acres (70%) of the dry forest is in a successional advanced condition. About 109 acres (2%) are in a low density condition and could be fire-climax.

Some species that are associated with the late successional or fire-climax conditions of these forests and that have special management status include: tailed frog, larch mountain salamander, northern goshawk, bald eagle, flammulated owl, pileated woodpecker, hairy woodpecker, white-headed woodpecker, black-backed woodpecker, Williamson's sapsucker, northern flicker, chestnut backed chickadee, pygmy nuthatch, elk, long-legged myotis, long-eared myotis, silver haired bat, fringed myotis, western big-eared bat, pallid bat, marten, and fisher.

Historically, only a minor portion of these areas provided the structures that are associated with suitable spotted owl habitat (Thomas et al. 1990, Buchanan et al. 1995). However, fire exclusion has allowed successional advancement for suitable spotted owl habitat to develop in some areas (Agee and Edmunds 1992, Buchanan et al. 1995). These areas are now being used by spotted owls, however the risk of large scale disturbances causing large scale habitat loss is of major concern (Agee and Edmunds 1992, Buchanan et al. 1995, Gaines et al. in press). One spotted owl activity center (S201) occurs in the Dry Forests just outside of the Lucerne LSR.

(2) Mesic Sites Within the Dry Forest

The mesic forest group could not be mapped for this LSR because of limitations posed by having to model the vegetation. Mesic sites within the dry forests provide important wildlife habitat and add diversity across the landscape. It is suggested that these sites be identified during project level analysis and that the appropriate treatment criteria be applied.

Historically, fire occurred less frequently at these sites (refer to the Disturbance Chapter in the Forest-Wide Assessment) allowing for succession that resulted in more complex forest structure such as a higher canopy closure, multilayering, snags and down logs. These forests occurred in a variety of successional stages across the landscape. The late-successional conditions of these Mesic Forests provide habitat for about 66 wildlife species. The high potential for future fires presents a concern about the sustainability of these forests.

Wildlife species that occur in these habitats and are of special management status include: tailed frog, Cascades frog, larch mountain salamander, northern goshawk, bald eagle, northern spotted owl, great gray owl, flammulated owl, pileated woodpecker, downy woodpecker, hairy woodpecker, white-headed woodpecker, black-backed woodpecker, three-toed woodpecker, red-breasted sapsucker, Williamson's sapsucker, northern flicker, little willow flycatcher, olive-sided flycatcher, chestnut-backed chickadee, pygmy nuthatch, elk, long-legged myotis, long-eared myotis, fringed myotis, Yuma myotis, western big-eared bat, silverhaired bat, pallid bat, marten, and fisher.

This forested vegetation group is capable of providing habitat structure that typically composes spotted owl nesting, roosting, foraging and dispersal habitat, while remaining within the historic range of variability.

## (3) Moist Grand Fir Group

The Moist Grand Fir group covers about 118 acres (1%) of the LSR. Historically, fire occurred less frequently than in the Dry and Mesic vegetation groups (refer to the Disturbance Chapter in the Forest-wide Assessment), allowing successional advancement and complex habitat structure such as high crown closure, multilayering, and many snags and down logs. These conditions provide habitat for a wide array of wildlife species, including 73 species within the Lucerne LSR.

Currently, about 71 acres (60%) of the Moist Grand Fir group in this LSR is in a late-successional condition. In the absence of any major disturbance, it is expected that in 50 years 101 acres (86%), and in 100 years 118 acres (100%) of this habitat would be in a late-successional condition.

Wildlife species associated with the late-successional conditions of this vegetation group and of special status include the northern goshawk, bald eagle, northern spotted owl, great gray owl, flammulated owl, pileated woodpecker, downy woodpecker, hairy woodpecker, white-headed woodpecker, black-backed woodpecker, three-toed woodpecker, red-breasted sapsucker, Williamson's sapsucker, northern flicker, little willow flycatcher, olive-sided flycatcher, red-breasted nuthatch, pygmy nuthatch, tailed frog, spotted frog, Cascade frog, larch mountain salamander, warty jumping slug, blue-gray tail-dropper, papillose tail-dropper, Columbia pebblesnail, long-legged myotis, long-eared myotis, fringed myotis, Yuma myotis, silver-haired bat, western big-eared bat, pallid bat, elk, lynx, marten and fisher.

The Moist Grand Fir vegetation group is capable of providing structures that compose suitable spotted owl nesting, roosting, and foraging habitat while remaining within the range of historic variability. No known spotted owl activity centers are located within this vegetation group.

## (4) Wet Forest Group

The Wet Forest Group covers only about 459 acres (5%) of the Lucerne LSR. Historically fire occurred relatively infrequently (refer to the Disturbance Chapter in the Forest-Wide Assessment) allowing for succession to result in complex forest structures such as high crown closure, multilayering, and high numbers of snags and down logs. These conditions provide habitat for about 54 species that are associated with the late-successional conditions of these forests.

Currently, 258 acres (56%) are in a late-successional condition. In the absence of any large scale disturbances in 50 years 301 acres (66%) would be in a late-successional condition, and in 100 years 459 acres (100%) would be late-successional.

Wildlife species that are associated with the late-successional conditions of this vegetation group and are of special status include northern goshawk, bald eagle, northern spotted owl, great gray owl, flammulated owl, pileated woodpecker, downy woodpecker, hairy woodpecker, white-headed woodpecker, black-backed woodpecker, three-toed woodpecker, red-breasted sapsucker, Williamson's sapsucker, northern flicker, little willow flycatcher, olive-sided flycatcher, red-breasted nuthatch, pygmy nuthatch, tailed frog, spotted frog, Cascades frog, larch mountain salamander, Warty jumping slug, blue-gray tail-dropper, papillose tail-dropper, Columbia pebblesnail, long-legged myotis, long-eared myotis, fringed myotis, Yuma myotis, silver-haired bat, western big-eared bat, pallid bat, elk, lynx, marten, and fisher.

The Wet Forest Group is capable of providing structure that composes suitable spotted owl nesting, roosting and foraging habitat while remaining within the historic range of variability. No known spotted owl activity centers are located within this vegetation group in the LSR.

## (5) Subalpine Fir/White Bark Pine

Subalpine Fir covers about 606 acres (7%) of the LSR. Historically, fire frequency was relatively low but when fires did occur they were of high intensity. The longer fire return interval allowed for successional advancement that resulted in complex habitat structure such as high canopy closure, high numbers of snags and down logs. Landscape pattern was historically highly variable with a mosaic of seral stages providing habitat for a variety of wildlife species. About 41 wildlife species within the LSR are associated with the late-successional conditions of these forests.

Currently, about 375 acres (62%) of the Subalpine Fir forests are in a late-successional condition. In the absence of any large scale disturbances it is expected that in 50 years 399 acres (66%), and in 100 years 606 acres (100%) would be in a late-successional condition. About 144 acres (2%) of the LSR is comprised of white bark pine forests that are not created openings.

Wildlife species that are associated with the late-successional forest in this vegetation group and have special status include the tailed frog, Cascade frog, larch mountain salamander, northern goshawk, bald eagle, northern spotted owl, great gray owl, pileated woodpecker, downy woodpecker, hairy woodpecker, black-backed woodpecker, three-toed woodpecker, Williamson's sapsucker, little willow flycatcher, olive-sided flycatcher, pygmy nuthatch, long-eared myotis, Yuma myotis, lynx, and marten.

Spotted owls occasionally use these forests, however, usually they only provide foraging habitat

### c) Species Specific Information

The information presented in this section provides an overview of what is known about the species identified in Appendix 27 as species of special status. Information is provided on a species by species basis whenever it is available.

#### (1) Endangered Or Threatened Wildlife Species

There are five wildlife species and one Critical Habitat that are federally listed as Threatened or Endangered and could occur within the Lucerne LSR. These include the bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*), northern spotted owl (*Strix occidentalis caurina*), grizzly bear (*Ursus arctos*), gray wolf (*Canis lupus*) and Critical Habitat Unit for spotted owls.

The bald eagle is known to occur within the Lucerne LSR and about 10% of the available habitat has been surveyed. Wintering bald eagles have been observed along the Lake Chelan and Domke Lake. A portion of the LSR is located in the Domke Lake Bald Eagle Recovery Territory. It is suspected that peregrine falcons occur within the LSR and 10% of their habitat has been surveyed.

#### (a) Northern Spotted Owls

There is 1 spotted owl activity center utilizing a home range in the Lucerne LSR. This is SO201, which is immediately adjacent to the LSR, inside Glacier Peak Wilderness. Outside the LSR, an unconfirmed pair of spotted owls was located in past years in the Klone Creek area. The next nearest known spotted owl site is 12 miles south through Wilderness, to the Entiat valley (Shady Pass LSR). Additional owls are 18 miles to the north west and to the south east. These sites are across naturally fragmented habitat. The Lucerne LSR was established to strengthen connectivity between the Wenatchee and Okanogan National Forests and the North Cascades National Park. This LSR is on the northern edge of the range for spotted owls, and has much dry forest type.

There are 3,454 acres (40%) of spotted owl habitat for nesting/roosting and foraging within the LSR, see Table ? . There is potential for 5,485 acres (63%) in the LSR . Potential spotted owl

habitat in the wetter forest groups (wet, moist and some multi-layered subalpine fir forests) account for 11% of the LSR, which is sustainable over time (generally this means that the late-successional forest structure in the wet forest group is at a relatively low risk to stand replacement fire in the short term.) Within the Lucerne LSR, 10% of the spotted owl habitat has been surveyed for spotted owls.

Table ? , Spotted Owl Habitat, Potential Habitat, and Sustainable Habitat in LSRs/MLSA.

LSR or MLSA	1996 Known Pairs & Singles	CHU S.Owl Pair Goals	Existing Suitable Spotted Owl Habitat			Potential SSOH			Sustainable SSOH			% For Inter ior
			Acres	Thresh	Target Pairs	Acres	Thresh	Target Pairs	Acres	Thresh	Target Pairs	
Sawtooth RW 139	0	--	1963 SAF	0.7 Pairs	X	3607 SAF	1.4 Pairs	X	2926 SAF	1.1 Pairs	X	6%
Slide Peak RW 137	0	--	258	0.1	X	341	0.1	X	0	0	X	0%
Lucerne RW138	1 site <sup>1</sup> WILDERNES S	--	3454	1.3	X	5485	2.1	X	976	0.4	X	20
Shady Pass RW136	5 sites + 1 <sup>1</sup>	5 Pairs	42224 SAF	15.8	X	51642 SAF	19.4	X	38898 SAF	14.6	X	31%

<sup>1</sup> Spotted owl activity center within 1/4 mile of LSR/MLSA boundary.

\* S.owl activity center may have been lost, due to 1994 Chelan Forest Fires, monitoring still underway.

<sup>2</sup> Spotted owl activity center on Private Land.

The estimated amount of habitat within a 1.8 mile radius of the spotted owl activity centers are shown in Table ?? The Lucerne LSR spotted owl SO201 is primarily in the dry vegetation type. The home range acreage is at threshold levels, of 2,663 acres for nesting/roosting/foraging habitat within 1.8 miles radius. The Core Area is greater than 500 acres within 0.7 miles radius. See Appendix 12.

Table V-1, Spotted Owl Information for Lucerne LSR

Spotted Owl	Repro Status <sup>3</sup>	Owner ship <sup>4</sup>	Dry or Wetter Owl <sup>5</sup>	Threshold <sup>6</sup>	Critical Habitat Unit (CHU)	Forest Interior? <sup>8</sup>	Existing SSOH 1.8 mi Radius & 0.7 mi R <sup>10</sup>	Activity Center 100 Ac <sup>11</sup>	Total Dispersal Habitat <sup>9</sup>
SO201 <sup>1</sup>	RS	FS	Dry	At Threshold	None	INSIDE	3,694 ac in 1.8 604 ac in 0.7	159 ac w/n 0.33 mi	93 ac
Historic s.owls									
DomkeL ake	HS	FS	Dry	NA	None	No	NA	-	-
Klone Cr adj GPW	P	FS	Dry	Unknown	None	INSIDE	Unknown	-	-

<sup>1</sup> Activity Center is Near the LSR or MLSA, but not inside the LSR or MLSA map boundary (< 1/4 mile).



<sup>3</sup> RS = Residential Single; P = Pair; PY = Pair with Young, based on **highest Reproductive occupancy**. (HS = Historical Single)

<sup>4</sup> FS = Forest Service; PVT = Private Ownership (**ownership** at activity center).

<sup>5</sup> If the majority of suitable spotted owl habitat in **0.7 mile circle** is dry or mesic forest groups, then it is a "dry" spotted owl. If the majority is wetter forest groups, then it is a "wetter" spotted owl.

<sup>6</sup> **Below Threshold:** < 2,663 total suitable spotted owl habitat acres in 1.8 mile circle **OR** < 500 total suitable spotted owl habitat acres in 0.7 mile circle.

**At Threshold:** 2,663-3,994 total suitable spotted owl habitat acres in 1.8 mile circle.

**Optimum/Target:** > 3,994 total suitable spotted owl habitat acres in 1.8 mile circle.

<sup>7</sup> The activity center is within 1/2 mile of the CHU.

<sup>8</sup> **Inside** = activity center is at least 600' inside (forest interior) late successional habitat.

**Near** = activity center is inside late successional habitat that creates a forest interior.

<sup>10</sup> **SSOH Habitat** within 1.8 mile radius (home range) and 0.7 mile radius (Core Area). **Dry suitable spotted owl habitat** includes vegetation code 12 where size/structure is multistory greater than 9" DBH; **mesic** Suitable includes code 22; and **wetter** Suitable includes codes 32, 36, 62, 64, and 42 (see appendix 2 GIS Veg Model & appendix 3 Veg Photo Mapping Key). Use the highest quality habitat available.

<sup>11</sup> A larger circle than 1/3 mile radius will be used to develop **100 Acre Activity Center**, if there is less than 100 acres of suitable habitat.

<sup>9</sup> **Dispersal Habitat** within 1.8 mile circle around activity center. **Dry** dispersal habitat includes vegetation codes 11, 13, and 52; **mesic** dispersal includes code 21; and **wet** dispersal includes codes 31, 35, 61, and 41.

#### (b) Critical Habitat Unit for Northern Spotted Owls

There is no Critical Habitat Unit (CHU) for spotted owls within the Lucerne LSR. The nearest CHUs are WA-5 (Entiat River CHU) and WA-4 (Twenty-five Mile CHU), both part of the Shady Pass LSR, (see appendix 13 and Appendix 34). For the Critical Habitat Unit process, the Lucerne LSR area was not identified as an important connectivity/dispersal area for spotted owls. The Lucerne LSR does provide connectivity between the Wenatchee National Forest, the North Cascades National Park and the Twisp CHU WA-1 on the Okanogan National Forest. The LSR provides genetic interchange for species on the edge of the range of the northern spotted (USFWS Memorandum, 1991).

In all LSR/MLSAs, except the Swauk LSR, Shady Pass LSR, Deadhorse LSR, Boundary Butte LSR, Tumwater MLSA and Sand MLSA, these reserves are predicted to provide the needs for spotted owl recovery over time (50+ years). They will also provide the function the CHUs were designated for. Coupled with the LSR/MLSA management, riparian reserve function, Wilderness areas, and Unmapped LSRs, the needs of the spotted owl will be met. These reserves function for connectivity and spotted owl home ranges. It is concluded that the LSR/MLSAs meet the function of the CHU system, as intended in the NWFP (NWFP C-9). Monitoring and maintaining connections, as well as meeting LSR goals will be ongoing.

#### (c) Grizzly Bear and Gray Wolf

No class 1 grizzly bear observations have been made within the Lucerne LSR, however, class 1 observations have been reported nearby (Almack et al. 1993). Grizzly bears are suspected to occur within the LSR and about 10% of their available habitat has been surveyed. Gray wolves

are suspected to occur within the LSR and about 20% of their habitat has been surveyed. In addition, confirmed wolf locations have been made to the north of this area (Gaines et al. 1995).

(d) Marbled Murrelet

The Lucerne LSR does not include any Marbled Murrelet habitat, it is well outside the marine foraging zone.

(2) Sensitive Species and Species of Concern

There are 15 wildlife species that are on the R6 Sensitive Species list or are USFWS species of concern that could occur within the Lucerne LSR. These include the goshawk (*Accipiter gentilis*), willow flycatcher (*Empidonax trailii*), olive-sided flycatcher (*Contopus borealis*), tailed frog (*Ascaphus trueii*), spotted frog (*Rana pretiosa*), Cascade frog (*Rana cascadae*), Columbia pebblesnail (*Fluminicola columbiana*), long-legged myotis (*Myotis volans*), long-eared myotis (*Myotis evotis*), fringed myotis (*Myotis thysanoides*), Yuma myotis (*Myotis yumanensis*), Western big-eared bat (*Plecotus townsendii*), lynx (*Lynx canadensis*), fisher (*Martes pennanti*), and wolverine (*Gulo gulo*).

(a) Birds

The goshawk is suspected to occur and surveys have been completed over about 10% of the available habitat. It is unknown if the little willow flycatcher and the olive-sided flycatcher occur. No surveys have been completed.

(b) Amphibians

Surveys for amphibians have not been completed within the Lucerne LSR. It is unknown if the tailed frog occurs in the LSR, and the spotted frog and Cascade's frog are suspected to occur in the LSR.

(c) Mollusks

No surveys for the Columbia pebblesnail have been conducted and it is unknown if they are present.

(d) Mammals

Surveys for bat species have not been completed. It is unknown or suspected that the long-legged myotis, long-eared myotis, fringed myotis, Yuma myotis or the western big-eared bat occur in the Lucerne LSR.

Surveys for lynx, wolverine and fisher have not been conducted. All three are suspected to occur in the LSR.

(3) Management Indicator Species

There are 12 wildlife species that are listed as management indicator species that occur or could occur within the Lucerne LSR. These species include the pileated woodpecker (*Dryocopus pileatus*), downy woodpecker (*Picoides pubescens*), hairy woodpecker (*Picoides villosus*), three-toed woodpecker (*Picoides tridactylus*), red-breasted sapsucker (*Sphyrapicus ruber*), Williamson's sapsucker (*Sphyrapicus thyroideus*), northern flicker (*Colaptes auratus*), ruffed grouse (*Bonasa umbellus*), mule deer (*Odocoileus hemionus*), elk (*Cervus elephus*), beaver (*Castor canadensis*), and marten (*Martes americana*).

(4) Primary Cavity Excavators

No formal surveys for primary cavity excavators have been completed. The pileated woodpecker, hairy woodpecker and northern flicker are known to occur within the LSR and the remaining MIS primary cavity excavators are suspected or it is unknown if they occur.

(a) Ruffed Grouse and Beaver

No surveys for the ruffed grouse have been completed and they are suspected to occur in the LSR. Surveys for beavers have been completed on about 5% of the available habitat and they are known to occur. Beaver activity has been observed around Domke Lake.

(b) Mule Deer, Elk, Mountain Goats

Surveys for mule deer have covered about 30% of the available habitat and they are known to occur within the LSR. Surveys for elk have not been conducted and they are suspected to occur. Mountain goats are known to occur in the LSR, wintering on the benches and rock outcrops between Domke Lake and Lake Chelan.

(c) Marten

Marten are suspected to occur in the LSR and about 5% of their available habitat has been surveyed.

(5) Survey And Manage, Protection And Buffer Species

There are eight species that do or could occur within the Lucerne LSR and are identified as survey and manage, or protection and buffer species. These include the great gray owl (*Strix nebulosa*), flammulated owl (*Otis flammeolus*), White-headed woodpecker (*Picoides albolarvatus*), black-backed woodpecker (*Picoides arcticus*), pygmy nuthatch (*Sitta pygmaea*), warty jumping slug (*Hemphillia glandulosa*), blue-gray tail-dropper (*Prophyaon coeruleum*), and papillose tail-dropper (*Prophyaon dubium*).

(a) Birds

It is unknown if the great gray owl occurs within the Lucerne LSR and surveys have been completed on about 5% of the LSR. No surveys have been completed for the flammulated owl, white-headed woodpecker, black-backed woodpecker, or pygmy nuthatch has been surveyed. The pygmy nuthatch, flammulated owl, white-headed woodpecker are suspected to occur in the LSR. It is unknown if the three toed woodpecker and black-backed woodpecker occur in the Lucerne LSR.

(b) Mollusks

It is unknown if the warty jumping slug, blue-gray tail-dropper, or papillose tail-dropper occur in the LSR and no surveys have been completed.

(c) Habitat Effectiveness

Habitat effectiveness was measured using the current open road density and the amount of security habitat. The current open road density within the LSR is 0.6 mi./sq. mi. and the amount of area in security habitat is 73%. This information shows that habitat effectiveness is considered to be "high" (<1 mi./sq. mi.) relative to roads and "high" relative to security habitat (>70%). The long term management objective for LSR/MLSAs is to manage towards a "high" level of habitat effectiveness defined as <1 mi./sq. mi. open road density and >70% security habitat.

### 3. Human Uses

### a) Overview

The Lucerne LSR is located adjacent to Lake Chelan between two extensions of the Glacier Peak Wilderness that extend down to the Lake. The point that juts out into the lake where the landing and some of the other concentrated use occurs is actually located outside the LSR. Road 8301 is the major travelway through the LSR. This road provides access for Holden Village (which lies outside the LSR). Lake Chelan is a natural lake that has been artificially raised by a dam located at the lake outlet. The lake is drawn down in March and April with lake levels being restored usually by June.

### b) Prehistoric and Historic Summary

There has been some prehistoric use of Lake Chelan known from sites and paintings on rock cliffs. The Lucerne area was one of the few relatively flat areas along the lake shore and mostly likely received some use because of this terrain feature.

Historic use of the area began in the late 1800's with mining exploration. Also about this time Lake Chelan became known as a place to go to improve your health. Lucerne became one of the attractions for these early day recreationists. About 1910 a small resort was developed on Domke Lake. This operation continues to this day. In the late 1930's work began constructing facilities for mining copper at Holden. This activity facilitated a growing community at Lucerne with several stores and a year-round population. During World War II mining operations peaked to supply demand for copper materials for the war effort. In the 1950's as the price of copper dropped, mining operations became less economically viable and the mining operation closed down. With this loss of economic benefit the village at Lucerne also diminished until today only foundations remain at this village site. In the early 1960's the Holden Village site was sold to the Lutheran Bible Institute. They have continued to the present operating the village as a retreat.

### c) Recreation

The primary access to this LSR (other than the Domke Falls Campground discussed in the following section) is through the boat dock at Lucerne. Access is also available by float plane to Domke Lake. Annually some 7,000 people disembark at the Lucerne boat dock. Probably 95% of them are associated with retreat activities held at Holden Village. The other 5% are wilderness backpackers, campers or Domke Lake Resort clientele. Moorage at Lucerne is available only during high water.

#### (1) Campgrounds

There are five campgrounds located within the LSR and one just outside, all are small campgrounds.

Lucerne Campground is located outside the LSR with two camp units. Refrigerator Harbor campground located inside the LSR, consists of four campsites and experiences the same use as Lucerne campground. During the peak use season, summer holidays and August, these campgrounds are typically filled on the weekends and half full during weekdays.

There are three campgrounds located on the shores of Domke Lake, this includes Domke Lake, Stewart and Hatchery Campgrounds. All three campgrounds have a total of 8 units. These campgrounds receive low to moderate amounts of use.

A sixth campground, Domke Falls is located on the southern end of the LSR, on the lakeshore with four campsites. This is a popular location, particularly with the boat tour operations on Lake Chelan as it offers a very scenic vista of the falls..

The campground use season extends from Memorial Day through Labor Day with some use during the fall hunting season.

(2) Dispersed Camping

There is little dispersed camping in this LSR.

(3) Trails

There are trails leading from Lucerne to Domke Mountain and Domke Lake open to hikers, horses and bikes. Another trail in the LSR provides access into the Glacier Peak Wilderness up Emerald Park. Two additional trails provide access to the Glacier Peak Wilderness and an alternate means to access Holden Village from Lucerne.

(4) Winter Use

There is limited winter use in this LSR. A few of the Holden staff remain and the manager of the Domke Resort remain throughout the winter. Holden does attract some people during the Christmas holidays.

(5) Other Recreation

A resort is located on Domke Lake consisting of a residence for the manager and two cabins for clients. The resort is quite popular and is often booked far in advance. The resort also rents canoes, row boats and small power boats. Many of the clientele for the resort arrive by float plane, landing in Domke Lake.

Domke Lake is particularly popular with fishermen.

There is some hunter use of this area, mostly during high hunt.

At Lucerne (outside of the LSR) is a parcel of private land leased to the Lake Chelan Boating Club. This includes a number of cabins that are managed for recreational use of the club's members.

d) Mining

There are no active mining operations within this LSR.

e) Social and Economic Considerations:

Road 8301 accessing Holden from Lucerne has mostly bus use from outfitter and Holden Village clientele. Some Forest Service administrative traffic also occurs.

Considerable economic benefit is derived from the recreational (and residential) use of this area. This includes the passenger business for the Lady of the Lake and the barges delivering supplies. The landing at Lucerne is year-round.

## **B. Analysis Between the LSRs**

### **1. Sustainability**

a) Sustainability Analysis

The sustainability of LSRs/MLSAs across the Forest is displayed in Table 19, *Vegetation Hazard and Ignition Risk Ratings* of the "Forest-wide Assessment for Late Successional Reserves and Managed Late Successional Areas, Wenatchee National Forest". The Lucerne LSR falls in the

upper one-third of all LSRs/MLSAs in terms of the amount of at-risk vegetation and the degree to which its current vegetative conditions are sustainable into the future. An important consideration in terms of sustainability is the relationship of the Lucerne LSR to neighboring LSRs. Three LSRs (Sawtooth, Shady Pass and Chiwawa) are, for the purposes of this analysis, considered to be neighbors. In terms of overall sustainability, Lucerne ranks lower than all three of its neighbors. The following table shows the acres at risk and the ignition risk determined in the Forest-wide sustainability analysis for Lucerne and its three neighboring LSRs.

Table V-2, Acres at Risk and Ignition Risk, Lucerne LSR.

LSR/MLSA	% of LSR/MLSA at Risk		% of LS Forest at Risk		Ignition Risk
	Acres	Pct.	Acres	Pct.	
Shady Pass	31,142ac	41%	31,044ac	69%	Moderate
Sawtooth	2,334ac	15%	2,331ac	97%	Moderate
Lucerne	4,985ac	58%	4,955ac	95%	High
Chiwawa	29,042ac	27%	21,345ac	38%	Moderate

When looking at sustainability issues between LSRs/MLSAs, the factor driving this analysis is the amount and location of at-risk vegetation between the Lucerne LSR and its three neighbors. In other words, identifying linkages in at-risk vegetation that would facilitate the spread of fire from one LSR/MLSA to another. A review of at-risk vegetation maps reveals that this linkage does not exist between the Lucerne and Sawtooth LSRs, due to the presence of Lake Chelan, which lies directly between the two.

On the other hand, Shady Pass LSR lies only one mile southeast of Lucerne, and the area between the two is comprised mostly of at-risk vegetation. This makes the spread of fire from one to the other very likely. Due to the Shady Pass LSRs position directly downwind from Lucerne, the spread of fire from Lucerne to Shady Pass is more likely than the reverse. There is no direct linkage in at risk vegetation between the Lucerne LSR and Chiwawa LSR, but there is an indirect linkage through the Shady Pass LSR. However, the 1994 Tyee Fire also burned most of the at-risk vegetation linking Shady Pass and Chiwawa LSRs, thereby greatly reducing the threat of fire spreading from one to the other in the near future.

#### (1) Implications

Although the analysis presented would indicate that the area lying between Lucerne and Shady Pass would be a high priority for fuel reduction efforts, this area lies within the Glacier Peak Wilderness. The wilderness designation limits fuel management options to only those consistent with wilderness management objectives, such as the use of prescribed natural fire.

## 2. Forest-Wide Northern Spotted Owl

The Lucerne LSR is not designated as one of the Forest's three large population cluster/source center LSRs, for the recovery of the spotted owl. The Lucerne LSR is part of the smaller "local population" centers, which are linked to the metapopulations through dispersing individuals (See Figures 1 and 2 with LSR and MLSA maps in the Forest-wide Assessment). The spotted owl is a Threatened species, with the recovery dependent on the implementation of the NWFP, especially in LSR/MLSAs (FSEIS Appendix G, Biological Opinion, 1994).

## 3. Connectivity (Plant, Wildlife, and Northern Spotted Owl)

## a) Plant Connectivity

Connectivity can be addressed at several spatial scales when assessing an individual LSR. Connectivity of the LSR'S/MLSA network on the Wenatchee National Forest has been addressed in Chapter VII and in Appendix 1. Vascular plant connectivity with surrounding LSRs or MLSAs is analyzed in this section (See the following table). Refer to the Forest-wide Assessment for discussions on connectivity descriptions of lichens, bryophytes and fungi.

Primarily, connectivity by vegetation group to the Sawtooth LSR only exists for species with high dispersal capabilities; the cause of this being Lake Chelan. Relative to the Shady Pass LSR, connectivity exists for all dispersal classes of the dry forest group. However, connectivity for any dispersal class of the moist grand fir and whitebark pine/subalpine larch vegetation groups is dependent on vegetation between Lucerne and Shady Pass LSRs. This is a consequence of limited occurrence of these vegetation groups in the Lucerne LSR. In the wet forest group and subalpine fir series, connectivity for the moderate and high dispersal classes is dependent on habitat between the Lucerne and Shady Pass LSRs.

Relative to the Chiwawa LSR, connectivity in the dry/mesic vegetation group is dependent on vegetation outside of the LSRs. Connectivity in the low dispersal class is dependent on the occurrence of habitat outside or between LSRs for the moist grand fir and wet forest vegetation groups, and the subalpine fir series. Connectivity for the moderate and high dispersal classes exists for the moist grand fir and wet vegetation groups, and the subalpine fir series.

No restoration opportunities were identified as a result of this analysis.

**Table V-3, Lucerne -- Vascular Plant Connectivity**

LSR/MLSA	Vegetation Group											
	Dry/Mesic			Moist GF			Subalpine			Wet		
Dispersal Class	1	2	3	1	2	3	1	2	3	1	2	3
Sawtooth	N	D	Y				N	D	D	N	N	Y
Shady Pass	Y	Y	Y				N	D	D	N	D	D
Chiwawa	D	D	D				D	Y	Y	D	Y	Y

Dispersal Codes = Y=Yes (Connectivity); N=No (Not Connected); A=Veg Group Absent; D=Dependent (Connectivity Depends on Outside Habitat); No entries indicate that that particular veg type was not present in the Lucerne LSR

## b) Wildlife Connectivity

Connectivity between late-successional patches is important to providing movement between patches, minimizing local extinctions, and reducing genetic isolation (Harris 1984, Noss and Harris 1986). In order to assess connectivity between Lucerne and adjacent LSR/MLSAs the dispersion index was used (as described in Appendix ?). A total of three potential linkages were evaluated: Lucerne to Shady Pass, Lucerne to Sawtooth and Lucerne to Twisp River (on the Okanogan National Forest). The overall dispersion index for this LSR was 1.3. The linkage between Lucerne and Shady Pass was rated as a 2 providing for moderate and high dispersal ability species. The remaining two linkages were rated as a 1, providing for only highly mobile species.

**Table V-4, Dispersion Indices for the Lucerne LSR**

Linkage	Distance(Miles )	High	Moderate	Low	Index
Lucerne-Shady Pass	2	Yes	Yes	No	2
Lucerne-Sawtooth	6	Yes	No	No	1
Lucerne-Twisp River	20	Yes	No	No	1
<b>Overall</b>					<b>1.3</b>

The Lucerne LSR was established adjacent to the Domke spotted owl site SO201. Connectivity between LSRs and MLSAs is essential for genetic interchange. The Lucerne LSR provides connectivity between LSRs on the Wenatchee National Forest, the North Cascades National Park and the Okanogan National Forest. The Lucerne LSR is fairly isolated and has drier habitat, but dispersal could occur to the Shady Pass LSR. Dispersal is difficult, but possible to the Twisp LSR on the Okanogan NF, as well as the Sawtooth LSR. For final recovery of the northern spotted owl, smaller LSRs/MLSAs contribute to the goal of occupied home ranges (See table ??? below). This LSR was not discussed as a Northern Spotted Owl Critical Habitat Unit. The spotted owl goal for this LSR is to provide habitat for the adjacent wilderness owl site. Over time (50 years) it is expected that the Lucerne LSR will not have enough sustainable habitat (moist forest groups) to fully support 1 pair of owls. The adjacent wilderness habitat is crucial to continue this linkage for spotted owls.

**Table V-5, Connectivity Between LSRs: Spotted Owl Pair Goals for LSRs and MLSAs, and CHUs.**

LSR or MLSA Status and Connectivity	S.Owl Pairs --1994, FSEIS Appendix G, Table G-3	Highest Occupancy and Reproductive Status, for Field Seasons 1995 ---- 1996		Number of Owl Pairs CHU Should Support, as per USFWS - CHU discussion.	
Twisp/War Cr LSR 141, Okanogan N.F.	1 Pr	?	?	1 Pr	WA-1
Black Cny LSR140, Oka. NF	0 Prs	0	0	--	NA
Sawtooth LSR RW 139, 78% Oka. NF	1 Pr - Oka NF	?	?	--	NA
Sawtooth RW 139, 22% Wen. NF	0 - WNF	0	0	--	NA
Slide Peak RW 137	0	0	0	--	NA
<b>Lucerne RW138</b>	<b>0</b>	<b>1 RS<sup>1</sup></b>	<b>1 site<sup>1</sup></b>	<b>--</b>	<b>NA</b>
Shady Pass RW136	4 Pairs	4 Pairs	5 sites + 1 <sup>1</sup>	5 Pairs	WA-5 (3pr) WA-4 (2pr)
Chiwawa RW 135	11 Pairs + 1 Res Single	16 Pairs + 3 Res Singles	18 + 1 <sup>1</sup> (7 Sites*)	21+ Pairs	WA-6

<sup>1</sup> Spotted owl activity center within 1/4 mile of LSR/MLSA boundary.



\* S. owl activity center may have been lost, due to 1994 Chelan Forest Fires, monitoring still underway.

<sup>2</sup> Spotted owl activity center on Private Land.

### c) Northern Spotted Owl Connectivity

Objectives in the Lucerne LSR should protect and enhance conditions of late successional and old growth forest ecosystems, while serving as habitat for late successional forest related species, including the northern spotted owl (NWFP A-4, 1994). LSRs and MLSAs are important for maintaining well distributed and well-connected spotted owl populations.

The four nearest LSR/MLSAs were evaluated to determine their potential for dispersal to occur. This analysis showed that spotted owls could possibly disperse to the Shady Pass LSR, through Emerald Park Creek and Snow Brushy/North Fork Entiat and from Railroad Creek to Entiat River. Once into Shady Pass LSR, spotted owls could disperse into the Chiwawa LSR. Connection to the Twisp LSR and Sawtooth LSRs could occur, however the area is severely fragmented along the shores of Lake Chelan and across the high mountains. See Forest Interior Map and Suitable Spotted Owl Habitat Maps. These connectivity corridors should be monitored for effectiveness, and should overlap into Riparian Reserves, unmapped LSRs, wilderness, etc.

#### (1) Restoration Opportunities And Potential Projects Between LSRs

1. Meet pair goals of LSR for contributing towards 1 pair of spotted owls.
2. Protection of LSR from outside from fires started within the Glacier Peak Wilderness.
3. Monitor connectivity outside the LSR, particularly in the Emerald Park Creek/Snow Brushy/North Fork Entiat areas.

## C. Analysis Within the LSR

### 1. Unique Habitats And Species

The following is the discussion and results of the Unique Habitat and Species module for the Lucerne LSR. For more information see Unique Habitats and Forest Interior Maps at the end of this chapter, Unique Habitats and Species Table (Appendix 37), Forest Interior Tables (Appendix 19), Riparian Reserves Map, Road Density tables (Appendix 20). For process see Unique Habitats and Species Module in Appendix 1 for order, explanations and process of modules.

#### a) Forest-wide Overview of Unique Habitats and Species

##### (1) Unique Ecosystems Landscape Analysis

Each LSR/MLSA is compared Forest-wide for unique habitats and species abundance, connectivity and function (See the "Function of the Network for Unique Habitats and Species", Chapter VII, Forest-wide Assessment). The Lucerne LSR is comparatively: low in habitat and species abundance; moderate for connectivity for these habitats and species; and low in function and process of unique habitats. Overall the Lucerne LSR has 10% in non-forested vegetation types (water, wetlands, meadows, grass/shrub/natural openings and deciduous forest); 20% in Forest Interior habitat; 61% in Late Successional/Successionally Advanced; 15 wildlife late-successional associated species or species of Special Status; and 0 identified plant late-successional associated species or species of special status.

The most unusual thing about this area is the amount of open water and wetlands associated with dry forest groups. These are along Domke Lake, Lake Chelan and associated wetlands, which provide habitat for bald eagle and loons.

The Lucerne LSR is within the Spine of the Cascades area of plant and animal rarity or endemism representing more western forests east of the Cascades, as per Columbia Basin Ecosystem Plan (Marcot et al, 1995 Draft).

Identified areas of high abundance, connectivity and function for unique habitats and species within the Lucerne LSR are:

- **Lucerne Mt. to Lightning Creek:** Whitebark pine/subalpine larch, meadows, shrub fields, natural openings, cliffs, riparian reserves.
- **Lightning Creek to Railroad Creek:** Large forest interior patch, large Security Habitat, Riparian Reserves, Natural Openings.
- **Wolverine Creek:** Deciduous forest, Security Habitat, shrub, riparian reserves, Forest Interior.
- **Domke Lake area:** Wetlands in a relatively dry forest, open water, marshy areas, Riparian Reserves, forest interior, disjunct forests, PETS (s. owl, loon, bald eagle, wolf), mule deer migration/fawning, Security Habitat.

Each LSR/MLSA can be evaluated for bio-diversity, connectivity and function (see Function of Unique Habitats in the Forest-wide Assessment). Past management activities affect the function of unique habitats and species. This includes open roads, roading of riparian reserves, and past harvest activities. For the Lucerne LSR: total open road density of 0.64 miles per square mile is very low (one of the lowest roading of LSRs on the Forest); security habitat of 73% is very high (one of the best on the Forest); roads and trails in riparian reserves of 0.57 miles per square mile is moderate to low (the second lowest on the Forest); and past harvest activities are lower amounts.

#### (2) Abundance and Ecological Diversity

Forest-wide, the Lucerne LSR has low amounts of unique habitats and species abundance. This includes acreage for unique plant and animal habitats, juxtaposition of habitats, availability of wilderness or areas of rarity, and known observations from the plant and animal species list. There is 10% of the LSR in non-forested vegetation types, and there are 15 wildlife species associated with late-successional habitat or Species of Special Status and 0 known plant species of special status or associated with late-successional habitat.

#### (3) Connectivity for Unique Habitats and Species

This LSR is fairly isolated, providing moderate amounts of connectivity for unique habitats and species. This includes the amounts, percent and number of forest interior patches, late successional habitat patches, and the juxtaposition to wilderness and areas of rarity. Due to the Lucerne LSR being isolated by high ridges, it does not provide a high or moderate degree of connectivity. Species utilizing the habitat within are tied to the specialized or unique habitats (ponds, wetland, rock, natural openings). The adjacent Glacier Peak Wilderness provides an important link.

#### (4) Process and Function of Unique Habitats and Species

The LSR has a low degree of function for unique habitats and species, (however, little surveys have been conducted for Special of Status plants and animals). The non-vegetated ridges in adjacent wilderness, also puts this in the lower ranks compared to other MLSAs and LSRs on

the Forest. Function and process includes development and maintenance of unique ecosystems, including ecological values for unique species and populations. The plant and animal species list for known observations makes up a large part of this analysis, as well as proximity to wilderness and areas of rarity, which sustain habitat function. See Chapter VII Forest-Wide Function of the Network for Unique Habitats and Species and the Forest-wide Unique Species and Habitats Table \_\_ in Appendix \_\_.

b) Unique Habitats and Species Known Within LSR

(1) Unique Habitats and Species Site Specific Analysis

The following is a summary of the Unique Habitats and Species Module for Lucerne LSR. For more information see the Unique Habitats and Forest Interior Maps at the end of this chapter, Unique Habitats and Species Table (Appendix 37), Forest Interior Tables (Appendix 19), Riparian Reserves Map, Road Density tables (appendix 20). For process see Unique Habitats and Species Module in Appendix 1 for order, explanations and process of modules.

**Table V-6, Unique Habitats and Species Module Summary**

	<b>Lucerne LSR</b>
Riparian Reserves	Over-all 12% of LSR in riparian reserves, moderate amounts.
	Streams (1,007 acres), Open Water (,1007 acres), Ponds, Wetlands and Seeps.
	Domke Lake and associated wetlands are important to offset the amount of dry forest in this area.
Non-Forested Vegetation	10% (871 acres) of LSR/MLSA
	Grass/Shrub/Natural Openings 2% (191 acres) and shrub fields 1% (124 acres) - Lightning Cr., Railroad Cr., and South Lake/Domke Creek.
	Wet Meadows 72 Acres, Subalpine Meadows 106 Acres - Lucerne Mountain.
	Rocks/Cliffs 0 Acres mapped - rock/cliffs along Domke Mt. towards Chelan; cliffs along Lightning Cr. & Lucerne Mountain.
Unique Forest Groups	Disjunct Forests - Western Red Cedar inclusions (esp. in wetlands of Domke); Black Cottonwood (in Wolverine Creek), Whitebark Pine/Subalpine Larch (on Lucerne Mountain); Flowering Dogwood.
	Forest Interior Habitat (0% moist), 20% dry - 3 large patches: 1,300 acres between Lightning Cr. and Railroad Cr.; 500 acres between Railroad and Domke; between Domke and Emerald in to Wilderness. Late-successional Habitat (4% moist) and Fire Climax/Successionally Advanced (52% dry and 5% SAF).
	Snags/Logs High to Moderate Quality from Landscape Level (see Snag sub-module).

	<b>Lucerne LSR</b>
Animal - Late Successional Associated Species and Species of Special Status	15 Species of Special Animals
PETS - Animals	4 species: Spotted Owl, Bald Eagle, Gray Wolf, Common Loon
Survey & Manage and Protection & Buffer	0 species:
Management Indicator Species (WNF)	5 species: Spotted Owl, Pileated Woodpecker, Primary Cavity Excavators, Mule Deer, Mountain Goat.
Other Animal Species of Special Status	<b>Species of Concern:</b>  Neotropical Migratory Birds: along the lakes, wetlands, shrub fields, meadows.
	<b>Late Successional Species</b>  Barred owl, Hairy woodpecker.
Plants - Late Successional Associated Species and Species of Special Status	0 Species of Special Plants
PETS - Plants	0 species: Suspect <i>Botrychium spp.</i> and <i>Pellae brachysptera</i>
Survey & Manage and Protection and Buffer Plants	Fungi, Lichens, Vascular Plants unknown.
Other Plant Species of Special Status	Unknown
American Indian Uses	Traditional Use Sites: pictographs, grinding bowls, winter sites near by.
	Vision Quest Sites: unknown
	Traditional Food Plants: unknown
	Food Gathering: Huckleberry, Deer, Fish, Mtn. Goat

c) Restoration Opportunities and Potential Treatments  
Uniques Within LSR:

- **Weeds (Knapweed, Millfoil):**
  1. Contain and eradicate knapweed spread off roads. Keep spread from entering LSR from Lucerne town-site.
  2. Contain and eradicate millfoil from Domke Lake.
- **Roads:**

3. Reduce roads and trails in Riparian Reserves near Railroad Creek and Domke Lake & tribs and other Riparian Reserve locations.
4. Reduce roads in forest interior patches.
- **Access:**
  5. Retain American Indian access to traditional use sites;
- **Habitat Improvement:**
  6. Reduce encroaching trees in subalpine meadows, natural openings and shrubfields where fire historically maintained them as meadows.
  7. For mountain goats, reduce encroaching trees in openings next to cliffs.
  8. Use prescribed fire in whitebark pine forests to maintain habitat overtime;
  9. Use prescribed fire in ponderosa pine with low density and large tree sizes;
  10. Create common loon nest structures (floating logs, platforms) in shoreline, adjacent to Lake Chelan and Domke Lakes.
  11. Plant/maintain shrubby vegetation, deciduous and conifers next to Domke Lake and tributaries, for beaver.
- **Protect:**
  12. Protect large trees and substrate 250' around caves, cliff, talus to benefit bat species (roads/trails/cutting).
  13. Consider establishing a Special Interest Area for wetlands in Domke wetlands areas;
  14. Protect and enhance riparian areas, wetlands, intermittent streams, and dispersal corridors in Riparian Reserves;
  15. Protect/maintain/enhance/monitor PETS species;
- **Coordinate and/or Acquire:**
  16. Coordinate unique habitat management and interpretation with Special Use Permittees at Holden Village and Domke Lake;
  17. Coordinate unique habitat management with Special Use Permittees.
- **Monitor:**
  18. Monitor for presence of common loons on Domke and Chelan.
  19. Monitor for beaver at Domke, develop management plan for long term forage availability;
  20. Monitor/inventory vegetation and wildlife use of deciduous forest in Wolverine Creek;
  21. PETS Monitor for presence - bald eagle nest territory Domke Lake; Peregrine Falcon nesting Lightening Creek Cliffs; gray wolf and grizzly bear from Emerald Park to Domke Mountain to Wolverine Creek;
  22. Monitor and maintain unique habitat concentrations;
  23. Monitor and maintain connectivity corridors.
  24. Survey & Manage prior to activities: Great Gray Owl, Larch Mt. Salamander, Lynx, Mollusks and other S&M or P&B species;
  25. Survey & Manage prior to activities: fungi, lichen, bryophytes, vascular plants.
  26. Follow PETS, Species of Concern, Species of Special Status guidelines in Biological Evaluations for projects.

## 27. Conduct surveys for unique species and habitats.

## d) Snag/Log/Green Tree Recruitment Module

The following is the discussion and results of the Snag/Log/Green Tree Recruitment sub-set module of the Unique Habitats module for the Lucerne LSR. Over-all, the Lucerne LSR has a high to moderate quality of available snags and future green tree recruitment snags and logs. (See appendix for order, explanations and process of modules.) Snag quality can be judged by a continual supply of tree structures in various stages of decay, size and species. This can be best provided in the moist and wet vegetation groups, areas with large amounts of late-successional habitat, areas with little fragmentation, areas with high amounts of forest interior, and areas with high functioning riparian reserves. (See "LSR/MLSA Snag/Downed Logs/Green Tree Recruitment Analysis", Appendix 38, Forest-wide Assessment)

Table V-7, Snag Habitat Quality/Landscape Scale, Lucerne LSR

<u>HIGH QUALITY **</u>	<u>* MEDIUM QUALITY</u>	<u>LOW QUALITY</u>
<b>Moist &amp; Wet Veg Groups</b> 6%	<b>Subalpine Fir &amp; Mesic Veg</b> 7%	<b>Dry &amp; Whitebark Veg</b> 77%
>60% LS (non-dry) Habitat	15% - 60% LS Habitat	<15% LS Habitat <b>9%</b>
80% - 100% LS (all) Habitat	40% - 80% LS/M Habitat <b>61%</b>	<40% LS/M Habitat
> 30% Forest Interior (non-dry)	15% -29% Forest Int Non-dry	<15% Forest Interior Not Dry <b>0%</b>
>10% Forest Interior Dry <b>20%</b>	5% - 9% Forest Interior Dry	< 5% Forest Interior Dry
>16% in Riparian Reserves	10% to 16% in Riparian Reserves <b>12%</b>	<10% in Rip Res
0 Mi/Sq Mi Any Rds in Rip Res	0 to 1 Mi/Sq Mi Rds in Rip Res <b>0.57 mi/sq/mi</b>	> 1 Mi/Sq Mi Rd Rip Res
< 1 Mi/Sq Mi Open Roads <b>0.64 mi/sq/mi</b>	1 Mi to 2.5 Mi/Sq Mi Roads	> 2.5 Mi/Sq Mi Roads
>70% Security Habitat <b>73%</b>	50% to 70% Security Habitat	<50% Security Habitat
>10% Past Burns Provide Snags		<10% Past Burns Provide Snags <b>&lt;10%</b> (80-100 yr remnants)
>50% Insect/Pathogens _% (see Insect/Disease Write Up)	25% - 50% Insect/Pathogens	< 25% Insect/Pathogens
<10% Past CC Harvest <b>2%</b>	11% - 25% Past CC Harvest	>25% Past CC Harvest
<10% Past PC Harvest	11% - 50% Past PC Harvest <b>--%</b>	>50% Past PC Harvest

(Percentages in bold indicate values for LSR)

- (1) Restoration Opportunities And Potential Projects For Snags/Logs

1. Monitor for snag dependent species, and snag longevity;
2. Retain snags at high end of range;
3. Complete snag analysis on 40 acre grid;
4. Manage insects and disease at endemic levels;
5. Reduce roads in Forest Interior patches.

e) Species with Special Status (Plant)

There are no known species with special status within the Lucerne LSRs. Therefore, the model can not be completed. There is potential habitat for a number of species with special status, but few surveys have been carried out to determine presence or absence. Plant surveys should be carried out in conjunction with restoration projects, as well as surveys independent of other activities. It is important that species ranges are known so that better estimates of species viability can be assessed. In addition, little is known about most species habitat and biological requirements, and inventories provide a first and necessary step in obtaining this information.

## 2. Plant Connectivity

Connectivity can be addressed by analyzing the connectedness of habitats within the LSR. Within the Lucerne LSR, most forest groups are fairly well connected. Many disjunct populations result from inherent breaks or openings in the landscape. At this time, information is not available to complete this type of analysis for the Lucerne LSR.

## 3. Wildlife Connectivity

The following is a result of applying the "within LSR/MLSA connectivity assessment process" to the Lucerne LSR.

**Table V-8, Lucerne LSR Wildlife Connectivity Rankings**

Connectivity Variable	Dry	WET	SAF	RR	Overall
% Late-success or Fire Climax	L	M	M	M	M
Open Road Density	M	H	H	H	H
Security Habitat	M	H	H	H	H
Forest Interior Roads	L	H	H	L	M
% Forest Interior*	L	L	L	L	L

Currently, the availability of habitat in a late-successional or fire-climax condition is at a moderate level in all vegetation groups except the dry forests. Restoration projects that promote the development of fire-climax conditions would improve the connectivity in this forest group. The overall open road density and level of security habitat provides for a high level of connectivity. The current level of forest interior connectivity is considered to be low. This is a concern for species with low mobility. The percent of each vegetation type in a forest interior will improve over time unless a large-scale disturbance occurs. It should be noted that the ranking for this variable may never be high as a result of natural landscape fragmentation. The amount of habitat within a forest interior needs to be evaluated based upon the ecological capabilities of the site and sustainability on a site-specific basis. Site-specific analysis is also

necessary to more adequately address connectivity for the less mobile species. This was not adequately addressed at the coarse/moderate filter approach used in this assessment.

(1) Restoration Opportunities

(a) Dry Forest Group

There is an opportunity to improve connectivity within the dry forest vegetation group through the implementation of thinning, prescribed fires, and road closures with associated revegetation.

(b) Wet Forest Group, Riparian Reserves and Subalpine Fir Forests

There is an opportunity to improve habitat connectivity within riparian reserves and interior forest patches by reducing the number of roads. This could include relocating roads or revegetating them to provide for connectivity for low mobility wildlife species.

#### 4. Disturbance Risk Analysis

The Lucerne LSR is one of the least sustainable reserves within the Wenatchee National Forest LSR/MLSA system. Over half of the Lucerne LSR, or roughly 4,500 acres, is composed of dense, successional-advanced dry forest. An additional 1,800 acres is low density dry forest situated on steep, ledgy slopes above the southern shore of Lake Chelan. These dry forest types typically consist of ponderosa pine and Douglas-fir; there is very little grand fir present except along streams and valley bottoms. Slopes are moderate to very steep. Douglas-fir dwarf mistletoe is common; infection levels are moderate to severe. The risk of ignition in the Lucerne LSR is high, with vertically-connected fuels contributing the probability of crowning fires.

Besides Douglas-fir dwarf mistletoe, many areas are currently experiencing outbreaks of western pine beetle. Historically, this insect attacked individual or small groups of mature ponderosa pine; currently outbreaks begin in dense young stands and spread to larger, mature trees.

At higher elevations, vegetation patterns appear to be strongly affected by snow avalanches that create stringers of shrubby vegetation within successional-advanced subalpine fir and wet forest types. Periodic debris torrents that deliver pulses of logs and boulders into streams are associated with the dominant landform within the LSR. These disturbances impart heterogeneity to landscape vegetation patterns and maintain stream and riparian structure and function. The modeled vegetation indicates a strong likelihood of whitebark pine and subalpine larch at higher elevations within the LSR. These upper elevation ecosystems, especially south and west-facing aspects with whitebark pine forests, may be at risk from fire exclusion and encroachment of subalpine fir forests.

Aerial surveys conducted by the Insect and Disease Group of Region 6 since the late 1940s indicate the following insect outbreaks occurring within the Lucerne LSR:

- Western pine beetle: 1950,
- Douglas-fir bark beetle: 1962,
- Mt. pine beetle (w. white pine or whitebark pine): 1959, 1975, 1979, 1981, 1988, 1990-91
- Mt. pine beetle (ponderosa pine): 1977
- Mt. pine beetle (lodgepole pine): 1988
- Western spruce budworm: 1976-77, 1980, 1985,
- Fir engraver: 1962, 1973, 1988



Susceptibility of the Lucerne LSR to fires, insects, and pathogens is shown in the following table. Mortality from biotic disturbance agents will be greatest where host continuity across the landscape is high and where there is overlapping moderate to high risk among two or more disturbance agents that act synergistically. Risk associated with biotic disturbance agents generally elevates the risk of catastrophic fires by potentially increasing fuel levels; this is especially true in the dry forest vegetation group and in vegetation upslope from or surrounded by dry forests.

**Table V-9, Disturbance Matrix, Lucerne LSR**

Veg	Dwarf Mistletoe			Root Decay								Total
Type	Fire	PP	DF	AROS	HEAN	WPBR	WSB	DFB	MPB	FE	WPB	Risk
10	H	M	H	L	L	-	M	M	-	L	H	H
11	H	M	H	M	M	-	M	M	-	M	H	H
12	H	M	H	M	M	-	M	M	-	H	H	H
30	M	L	L	L	M	M	L	L	-	L	L	M
31	M	M	M	L	M	M	M	L	-	M	L	M
32	H	M	M	L	M	M	M	M	-	H	L	H
40	L	L	L	L	L	M	L	L	-	L	L	L
41	M	L	L	L	L	M	L	L	M	L	L	M
42	H	L	L	L	L	M	L	L	L	M	L	H
60	L	L	L	L	L	H	L	L	-	L	-	L
61	L	L	L	L	L	H	L	L	-	L	-	L
62	L	M	M	L	M	H	M	M	-	M	-	M
71	M	L	L	L	L	H	L	L	M	-	L	L

**Key to Column Headings:** PP = Ponderosa Pine, DF = Douglas-fir, WL = Western Larch, PIPO = Ponderosa Pine; PSME = Douglas-fir; LAOC = Western Larch; AROS = Armillaria root disease; HEAN = Annosus root disease; WPBR = White Pine Blister Rust; WSB = Western Spruce Budworm; DFB = Douglas-fir Beetle; MPB = Mountain Pine Beetle; WPB = Western Pine Beetle.

**Key to Letters** “-” = no risk; “L” = low risk, “M” = moderate risk, “H” = high risk

**Veg Type** codes: refer to Appendix 3, in the “Forest-wide Assessment for Late Successional Reserves and Managed Late Successional Areas, Wenatchee National Forest”.

Seventy-nine percent of the Lucerne LSR has a high composite risk to disturbances. Areas at risk include the dense, dry forest types, the low density dry forests (because of high levels of Douglas-fir dwarf mistletoe), layered mature moist grand fir, and the layered subalpine fir forests. The latter two types are at high risk both from adjacency to drier forests and because insect and pathogen activity has increased fuel loads and vertical and horizontal fuel connectivity within these vegetation types.

Management objectives to reduce risk of habitat loss to catastrophic wildfires, insects, and pathogens include reducing stand density, altering species compositions, and reducing vertical and horizontal fuel continuity in dry forest types. Silvicultural and other options to attain objectives within dry forest include thinning (PCT/CT); pruning; fuelwood collection; mechanical fuel treatments; hand piling fuels; prescribed fire; favoring seral, fire-resistant species such as ponderosa pine, and western larch; and developing or maintaining fuelbreaks.

Silvicultural options to protect moist grand fir and subalpine fir forests include treating adjacent dry forest stands as described above; and developing or enhancing fuelbreaks. Prescribed fire or prescribed natural fires may be helpful in maintaining or restoring whitebark pine ecosystems.

## 5. Northern Spotted Owl

The following is the discussion and results of the within LSR Spotted Owl Module for the Lucerne LSR. This module reviews the home range sites for spotted owls, as well as connectivity within the LSR/MLSAs. Appendix 1 further describes the order, explanations and process of modules, specifically the Northern Spotted Owl Module, Individual LSR/MLSA. See Suitable Spotted Owl/Dispersal Habitat and Activity Center map and tables, Forest Interior Map and tables, Riparian Reserve map and tables and Security Habitat map and tables.

The recovery of the federally Threatened northern spotted owl is highlighted in management strategies within LSRs and MLSAs (See appendix 1 - Northern Spotted Owl Module, Individual LSR/MLSA). This includes:

- LSRs and MLSAs will meet the goals for the numbers of owl pairs within each LSR or MLSA (NWFP 1994 B-4; NWFP C-9; FSEIS Appendix G, Biological Opinion, 1994; USDI. 1992. Northern Spotted Owl Recovery Plan, and USFWS Memorandum, 1991);
- Each spotted owl's 100 acre Activity Center will have the best quality habitat established and retained;
- Each spotted owl's 500 acre Core Area will have the best quality habitat and habitat will be retained;
- Each spotted owl home range will meet threshold acreage's (2,663 acres) as a minimum. Wetter owl sites in LSRs will meet target or optimal habitat of 3,994 acres.;
- Sustainable, suitable spotted owl habitat outside home ranges will be maintained ;
- Dispersal habitat within and outside LSR/MLSA will be provided; (NWFP 1994, ROD pg. 19, C-3, C-10 to 11, C-39, C-45, D-9, App 3-4, pg. 240-241).
- Habitat conditions for long-term (> 50 years) sustainable nesting/roosting/foraging habitat will be improved (see DEC's and DC's in Forest-wide document, Chapter III PP 87-95.)
- The risk of habitat loss and nest site loss will be reduced (NWFP 1994, C-12 to 16, C-26);

The Lucerne LSR is mostly in the dry forest group (77%), however the spotted owl activity center has approximately half it's home range in moist/wet/high elevation forest. The best quality suitable habitat for spotted owl SO201 home range is inside the adjacent Wilderness. The Desired Condition for spotted owl habitat in dry LSRs is 40% of the 1.8 mile home range radius, which is 2,663 acres. This drier forest LSR will be managed for risk and hazard reduction, over spotted owl habitat maintenance (after meeting threshold goals). LSRs in general, accept more risk of hazards, than do lands outside in Matrix. MLSAs accept less risk of hazards than do LSRs.

a) Suitable Spotted Owl Habitat

The amount of nesting/roosting/foraging habitat within the Lucerne LSR is 3,454 acres (40% of the LSR). Of this, 730 acres (8%) are in wet, moist, and subalpine fir forests. This wetter spotted owl habitat has a higher chance of Sustainability, than dry and mesic forest groups. The LSRs predominate forest vegetation is dry (6,446 acres - 75%), of which 2,724 acres (32%) is N/R/F spotted owl habitat. There is no mesic forest suitable habitat.

There is a potential for the LSR to reach 5,485 acres (63%) of suitable habitat. However, much of this potential habitat is in the drier forest groups, and not sustainable. Sustainable spotted owl habitat within this LSR is approximately 976 acres of moist forest group habitat. It is doubtful that 1 pair of spotted owls can be sustained in this LSR over the long-term (> 50 years). See Table ? , which displays the potential number of owl pairs for the various scenarios.

Dispersal habitat currently is 1,991 acres, and is a mix of high elevation and moist forest groups in the Lightning Creek area. (See Appendix 13 "Suitable Habitat Acreage's", Appendix 4 & 5 "Vegetation Acreage's", and Suitable Spotted Owl Habitat Maps). The most contiguous and sustainable suitable spotted owl habitat in the LSR is in the Lightning Creek headwaters and the Domke Lake/Emerald Park Creek areas. Dispersal habitat in these areas should be allowed to advance successional, to provide added owl nesting, roosting and foraging habitat.

The LSR contributes habitat for the owl site adjacent in Wilderness. Habitat analysis for the Lucerne LSR is based on vegetation modeling, and a model of spotted owl habitat structure. The map and acreage's should be validated prior to project implementation.

Potential disruption to spotted owl habitat, outside the LSR, is the dry forest risk to fire surrounding the LSR. This concern is highlighted around the developments of Lucerne, Holden Village and Domke Lake. To meet the recovery goals for the spotted owl, there is a need to reduce risk to spotted owl habitat within the spotted owl home range.

This LSR/MLSA is part of the reserves that are predicted to provide the needs for spotted owl recovery over time (50+ years). Coupled with the LSR/MLSA management, riparian reserve function, Wilderness areas, and Unmapped LSRs, the needs of the spotted owl will be met. The reserves function for connectivity and spotted owl home ranges. With the exception of a few LSR/MLSA's that are not sustainable, it is concluded that the LSR/MLSA reserves on the Wenatchee National Forest meet the function of the CHU system, as intended in the NWFP (NWFP C-9). Monitoring and maintaining connections, as well as meeting LSR goals will be ongoing. (See Appendix 1, "Forest-wide Spotted Owl Module" and "Individual LSR/MLSA Spotted Owl Module")

b) Spotted Owl Home Ranges

Within the Lucerne LSR, the estimated amount of habitat within a 1.8 mile radius of the activity center is shown in Table ??? below. The spotted owl home range is at threshold acres, both within the core area of 0.7 miles radius and the home range of 1.8 miles radius. The Domke owl needs Wilderness habitat to maintain it's threshold acreage. The majority of the home range for this owl is in the wetter forest groups (2,105 acres), see Table below. There are some dispersal acres (93 acres in Emerald Park Creek) within this owl's home range. This dispersal habitat is in Wilderness and should develop towards late successional habitat (structure and size) over time. The spotted owl site should be monitored and habitat verified. The remainder of the LSR should be inventoried for possible spotted owl sites, especially between Lightning Creek and Railroad Creek. Adjacent to the LSR, in Klone Creek, a spotted owl pair has been found in the past and should be inventoried, as it is close to the LSR.

The wetter habitat is limited and in remote portions of this LSR. There is potential to reduce fire risk from the dry forest types. This meets the long term strategy for sustaining spotted owl population viability. There is also a need to protect existing home ranges, which may cause a higher risk to fire in the dry forest habitat maintained for the spotted owl. Overtime, it is expected that higher quality and more sustainable habitat will be restored to the LSR. The drier forests within the LSR will eventually be managed for other late-successional species. (See Table below.

**Table V-10, Suitable Spotted Owl Habitat, Lucerne LSR**

	SUITABLE SPOTTED OWL HABITAT <sup>10</sup>											
	1.8 mile Circle Around Activity Center						0.7 mile Circle Around Activity Center					
Spotted owl	Dry	Mesic	Moist	SAF	Wet	Total	Dry	Mesic	Moist	SAF	Wet	Total
SO201 <sup>1</sup>	1,590	0	537	809	759	3,694	417	0	159	0	28	604
Historic Owl												
Domke Lake												
Klone Cr adj GPW												

**Table Above Continued Here**

				Restore
Dispersal Habitat				Opps
Dry	Mesic	Wet	Total	*
6	0	87	93	m,p
				m
				m,p

<sup>1</sup> Owl Site adjacent to LSR/MLSA. Less than 1400' from Boundary.

**Below Threshold:** < 2,663 ac suitable spotted owl habitat in 1.8 mi circle **OR** < 500 ac suitable spotted owl habitat in 0.7 mi circle.

**At Threshold:** 2,663-3,994 total suitable spotted owl habitat acres in 1.8 mile circle.

**Optimum/Target:** > 3,994 total suitable spotted owl habitat acres in 1.8 mile circle.

<sup>10</sup> **Dry suitable spotted owl habitat** includes vegetation code 12 where size/structure is multistory greater than 9" DBH;

**mesic** includes code 22; and

**wet** includes codes 32, 36, 62, 64, and 42.

- **Restoration Opportunities:** **M** = Monitor Habitat & Site; **P** = Protect Habitat From Fire; **A** = Accelerate Habitat Towards Nesting, roosting, Foraging; **C** = Coordinate Habitat and Site Management, or Acquire Habitat.

c) Spotted Owl Dispersal And Connectivity

The LSR has only one spotted owl, there is not potential for more than one owl to be sustained on site. Connectivity within the LSR is based on dry forest nesting/roosting/foraging and dispersal habitats. Important connectivity habitat exists from Domke Lake to Railroad Creek to Lightning Creek. Habitat quality for the LSR is lower overall, except near the north aspects of Domke Lake and the headwaters of Lightning Creek.

Important connectivity corridors and patches between LSRs/MLSAs include Emerald Park Creek and Snow Brushy/North Fork Entiat, and from Railroad Creek to Entiat River into the Shady Pass LSR. Other connectivity's include: along south shore forests of Lake Chelan to Stehekin and over War Pass to Twisp LSR. There appears to be very little direct connectivity to the Sawtooth LSR. An important linkage may have been disrupted in the 1970 fires, and no longer functions.

During dispersal - nesting, roosting, foraging habitat is used, as well as habitat of lower quality (dispersal habitat). Dispersal habitat includes single story stands, and smaller trees with at least 40% crown closure. Dispersal habitat within the Lucerne LSR is 1,991 acres (23%) and can grow up to be nesting/roosting/foraging habitat. Habitat providing dispersal/connectivity corridors within the LSR are primarily along riparian reserves and north aspects (see Forest Interior map and Suitable Spotted Owl Habitat Map).

The function of dispersal/connectivity habitat for spotted owls depends on the amount and juxtaposition of late-successional, forest interior, and dispersal habitat. The Lucerne LSR currently has 9% in late-successional/successionally advanced wetter forest habitat. Another 52% is in dry forest successionally advanced, which is not sustainable. There is a low amount of forest interior habitat (20%), the spotted owl activity center is located on a patch. The natural landscape accounts for much of the disruption to Forest Interior habitat. Some fragmentation is from created openings (2%). The low road densities (0.64 miles per square mile) and high Security Habitat ( 73%) has had little effect to connectivity. Fragmentation usually occurs along roads, and snag reductions for road maintenance cumulatively effects habitat overtime.

Outside the LSR/MLSA network, dispersal habitat is found in all land allocations, and will be provided mainly in Riparian Reserves, in Unmapped LSRs in Matrix/AMA's, and in wilderness areas (NWFP 1994, ROD pg 19, C-3, C-10 to 11, C-39, C-45, D-9, App 3-4, pg. 240-241).

d) Restoration Opportunities And Potential Projects - Within LSR

- **Monitor Effectiveness**

1. Meet goals of LSR for 1 pair of spotted owls.
2. Monitor spotted owl activity centers, 500 acre core and home ranges of spotted owls for SO201 (Domke). (Including habitat in Glacier Peak Wilderness).
3. The remainder of the LSR should be inventoried for possible spotted owl sites, especially between Lightning Creek and Railroad Creek. Especially Domke Mountain.
4. Monitor connectivity outside LSR (Emerald Park Creek/Snow Brushy/North Fork Entiat, Railroad Creek, Stehekin connection). Especially Klone Creek.

- **Monitor Validity**

5. Validate vegetation modeling.
6. Validate spotted owl mapping, LSR acreage's, and home range acreage's.
7. Field verify habitat and activity-center locations.
8. Validate the long-term the assumption that the Lucerne LSR will not have enough sustainable habitat (moist forest groups) to fully support 1 pair of owls. The adjacent wilderness habitat is crucial to continue this linkage for spotted owls.

- **Monitor Implementation**

9. Reconfigure spotted owl habitat home range, based on foraging pattern, rather than 1.8 mile circle.
10. During management proposals, use habitat quality/risk assessment analysis (Appendix 29) to help display best quality habitats and stands of highest risk to loss.

- **Protection**

11. Protect spotted owl home ranges within LSR, between owl circles, by implementing risk reduction first on non-suitable habitat, then on Dry and Mesic habitat.
12. Fuels reduction and hazard reduction occur outside N/R/F habitat in short term, shift emphasis after 50 years. Accept more risk from fire, manage at high end of spotted owl habitat DC in wet sites. 500 Acre core area protected, 100 acre activity center protected.
13. Protect and/or create connectivity outside LSR: Glacier Peak Wilderness, Lake Chelan National Recreation Area, North Cascades National Park.

- **Maintain**

14. The SO201 home range dispersal acres (93 acres in Emerald Park Creek) is in Wilderness and should develop naturally towards late successional habitat.
15. Sustain spotted owl habitat inside LSR in north aspects, riparian reserves of Lightning, Wolverine, Railroad and Domke Lake.
16. Maintain dispersal/connectivity habitat within LSR (see unique habitats list).
17. Maintain dispersal/connectivity habitat and connectivity towards Shady Pass LSR (Emerald Park Creek/Snow Brushy/North Fork Entiat and Railroad Creek/Entiat River).

- **Habitat Improvement**

18. The contiguous and sustainable suitable spotted owl habitat in the Lightning Creek headwaters and the Domke Lake/Emerald Park Creek areas should be allowed to advance successional, to provide added owl habitat.

- **Coordinate**

19. Cooperate and encourage Special Use Permittees and National Park to manage identified sites and connectivity areas for owls.

## 6. Aquatic

The Lucerne LSR is located along the south shore of Lake Chelan. Lake Chelan is a large, approximately 50 mile long glacial carved lake tributary to the Columbia River. Reaching from the base of the North Cascades to almost the Columbia River, Lake Chelan is a very popular recreation area. While much of the lake shore and watershed is relatively pristine, accessible

only by foot, boat horseback or float plane, the native fish community has been greatly altered by introductions of exotic species.

#### a) Geomorphology

The Lake Chelan Basin has been heavily influenced by glaciation. Most of the basin lies within the Chelan and Sawtooth Highlands subsection with a portion of the northwestern, north and northeastern portion of the basin falling into the Wenatchee Mountains subsection. The landscape has been influenced by both alpine and continental glaciers. Lake Chelan occupies the trough of the Chelan Glacier. (The lower end of Lake Chelan however marks the terminus of the Columbia Glacier (continental)). Primary differences between the Wenatchee Highlands and the Chelan Sawtooth Highlands is the presence of pronounced cirques, trough walls and trough valley bottoms and a maritime climate influence within the Wenatchee Highlands. The Chelan Sawtooth Highlands have less pronounced cirques and valleys, and are more influenced by a continental climate. The geomorphic characteristics of the Lucerne LSR are most like the Wenatchee Highlands.

Alpine glaciation is the primary land forming process within the Wenatchee Highlands. The alpine glaciers created headwater cirques, and broad, U-shaped valleys with steep trough walls covered with till material. The subsection is strongly influenced by a maritime climate. The upper ridges, typically a cirque landform, receive heavy snowpacks. The exposed bedrock has little capability to absorb runoff which can cause a flashy flow regime. The till material on the lower slopes however is able to absorb runoff holding near surface water, creating seeps and springs which help maintain base flows and relatively low stream temperatures.

Debris slides and fires are primary natural disturbance processes. Unusual runoff, such as rain-on-snow events can trigger debris slides in incised, first order tributaries. These debris slides are an important mechanism for the delivery of wood, coarse and fine sediment to streams. The debris flows therefore are an important mechanism shaping the aquatic environment.

#### (1) Management Concerns Due to Geomorphology

Riparian reserves may need to be relatively wide adjacent to streams, including low order streams, to maintain wood and other material for eventual delivery downstream. Road construction and timber harvest activities need to be carefully planned and implemented so as to not increase debris flow rates. Roads also need to be located and designed so as to not capture near surface ground water which can create surface erosion concerns

#### b) Lake Chelan

The Lucerne LSR borders the southwestern shoreline of the upper portion of Lake Chelan. The LSR includes the lower reaches of Railroad Creek, and Domke Lake. The native fish community has been greatly altered by man. Historically bull trout and westslope cutthroat trout and mountain whitefish (*Prosopium williamsoni*) were the salmonid species native to the Lake Chelan subbasin. Anadromous species were absent as Chelan Falls near the confluence of the Chelan River and the Columbia River was a natural passage barrier. Bull trout are now believed to be extirpated from the system and cutthroat populations have been diminished. Non-native kokanee salmon, rainbow trout, lake trout (*Salvelinus namaycush*) and chinook salmon have been introduced. The non-native species now form the basis of popular sport fisheries. Lake Chelan subwatersheds included within the LSR are Domke, Lower Railroad and Southwest Shore lake Chelan.

Both westslope cutthroat trout and non-native rainbow trout are found in Railroad Creek. Some kokanee salmon spawning occurs in the lowest reaches of the stream. An old mine in the upper

reaches of Railroad Creek at the village of Holden has impacted Railroad Creek. Mine tailings have greatly reduced the floodplain. Leaching from the tailings and/or seepage from the mine portal are causing low pH conditions and forming iron precipitates on the substrate greatly impacting the aquatic habitat in the vicinity of Holden and, to a lesser extent, downstream.

#### (1) Late Successional Habitat Management Concerns

Management for late successional habitat objectives will need to provide for riparian and aquatic habitat associated with Domke Lake, Railroad Creek and Lake Chelan. Relatively aggressive late successional habitat management practices may be possible though especially on lands adjacent to Lake Chelan with little conflict with aquatic and riparian habitat objectives. Lake Chelan has little littoral habitat and is very deep adjacent to the LSR. Many tools for vegetation management may be available to meet late successional habitat objectives with little risk to aquatic resources. Management activities will need to maintain linkages between upslope and stream channel processes especially in the glacial trough landform in the Railroad Creek drainage. Potential short term adverse impacts to riparian habitat designed to meet long term terrestrial and aquatic ecosystem health may be an acceptable risk in this LSR.

### 7. Noxious Weeds

Two species are known to occur within or nearby the Lucerne LSR. *Centaurea diffusa* is known to occur at Lucerne just outside the LSR and prevention of spread into the LSR would be of high priority. Also, *Crupina vulgaris* occurs on the north side of Lake Chelan and prevention of spread of this species into the Lucerne LSR would be of high priority. Current information is lacking regarding the presence of other noxious weed species within the Lucerne LSR, therefore, the model can not be completed at this time. Survey for species presence and extent should be completed in order to develop a noxious management plan for this LSR'S (refer to Harrod 1994).

### 8. Fire Management Plan

#### a) Overview

This plan is intended to provide guidance for the management of fire in the Lucerne LSR. It will supplement the Fire Management Plan for the Late-Successional Reserve System and will be incorporated into the Fire Management Action Plan for the Wenatchee National Forest.

The Sustainability and Disturbance modules for the vegetation groups have been described in a separate portion of this chapter. The intent of this plan is to provide adequate protection of the reserve. Management practices will be initiated to provide for the protection of the late-successional associated species and associated unique habitats. These management actions are expected to include the role of fire disturbance as an important process in the reserve.

#### b) Wildfire Prevention Actions

The following actions are site specific for the Lucerne LSR. They are intended to supplement the actions outlined in the Fire Prevention Plan, which is intended to be implemented on a Forest-wide basis:

1. Initiate campfire restrictions, as warranted, during periods of high fire danger.
2. Emphasize campfire restrictions, as warranted, during Mule Deer and other hunting seasons.
3. Emphasize cooperative fire prevention activities.



4. Utilize cooperative law enforcement agreements to emphasize the inspection of spark arrestor and exhaust systems.
5. Continue and improve fire prevention signing program on roads, trails, and communities (e.g., Lucerne) included in, or adjacent to, the LSR.
6. Emphasize contact with special interest groups (e.g., Lake Chelan Boat Company, Lake Chelan Boat Club, Lake Chelan Airways, Pacific Northwest Outward Bound, Outfitter Guides, National Outdoor Leadership School, and Holden Village).
7. Emphasize fire prevention education for hunters, particularly during the High Hunt.
8. Emphasize fire prevention and wildfire risk awareness education for the public (e.g., Lucerne Bar and Holden Village residents).
9. Seek opportunities to initiate hazard reduction actions around private lands (e.g., Holden Village and Lucerne Bar).
10. Initiate hazard reduction actions around developed and dispersed recreation sites, such as:
  - Lucerne Campground
  - Refrigerator Harbor
  - Domke Lake Campground
  - Domke Falls
  - Stewart Campground
  - Hatchery Campground
11. As a hazard reduction measure, emphasize fuel wood collection in designated areas around recreation use sites.
12. Initiate hazard reduction actions along FS Road 8301 (Railroad Creek drainage).

c) Fire Management Actions Intended to Keep Fire from Spreading into the LSR

The following methods are proposed to protect the LSR from fires originating outside LSR boundaries:

1. Maintain and manage existing fuel breaks.
2. Complete pre-attack planning process for LSR. Utilize natural fuel breaks when possible.
3. Maintain existing pre-attack facilities/agreements (e.g., water chances, helispots, fire camps, etc.): Seek opportunities for more.

d) Fire Detection

1. Aerial detection may be supplemented with emergency staffing at Junior Point.
2. The detection and report of fire from other resources (e.g., the Lake Chelan Boat Company and the Lake Chelan Airways).
3. Emphasize fire reporting procedures (e.g., with local residents, Forest users, and cooperators).

e) Wildfire Suppression

1. Spotted owl activity centers are the highest priority for protection of resources (following the protection of human life). All wildfires in the 1.8 mile buffer will be suppressed at minimum acres.
2. Pre-planned dispatch cards for initial attack will be prepared for the LSR area.
3. The Fire Situation Analysis or the Escaped Fire Situation Analysis process will be used to guide extended attack and large fire-suppression. Utilize pre-attack plans and materials.
4. Consideration for private land, late-successional habitat, and riparian reserves will take place during the development of fire suppression strategies and the implementation of fire suppression tactics.
5. Emphasize the protection of improvements (e.g., historic/cultural sites).
6. Protect known threatened and endangered species habitat from wildfire (i.e., plant or animal).
7. Where appropriate, fire suppression actions will be implemented on an interagency basis.

f) Vegetation and Fuels Management

1. Manage for a mosaic of age classes and structural conditions across the landscape to support late-successional habitat.
2. Manage to sustain dry forest types.
3. Manage for mesic sites with high density, multi-story refugia.
4. Strategic fuel manipulation to reduce the size and intensity of fires within, and adjacent to, the LSR boundary (e.g., pruning, thinning, and fuel breaks). Provide a change in the continuity/arrangement of, at risk, vegetation/fuels. Emphasis to utilize existing fuel treatment areas, natural openings, roads, ridgetops, etc.
5. Suggested management tools to sustain, enhance, or produce the conditions for late-successional habitat and provide for wildfire hazard reduction may include: pruning, commercial and pre-commercial thinning, wood gathering, mechanical treatments, and prescribed fire.

g) Prescribed Fire Opportunities

1. Recognize the use of prescribed fire as a management tool in this LSR and in areas adjacent to this LSR.
2. Priority outcomes throughout the LSR are to sustain, enhance, or produce the conditions for late-successional habitat and provide for wildfire hazard reduction.
3. Ignitions above 5000' may be considered candidate fires and may be managed as prescribed fires, once prescribed fire plans are completed.
4. Projects should be of scale/location to enhance landscape-level diversity tied to inherent disturbance regimes.
5. Projects should attempt to minimize the risk of future catastrophic wildfires (those outside the range of inherent disturbance regimes with respect to size and/or severity).

## h) Summary

Fire prevention, fire detection, wildfire suppression, vegetation and fuels management, and prescribed fire are all appropriate, integral elements of the overall management of this LSR.

### D. Restoration Opportunities and Potential Project Summary

The following table summarizes the restorations opportunities and potential projects as identified from each module.

Table V-11, Restoration Opportunities and Potential Projects, Lucerne LSR

Analysis Module	Restoration Opportunity	Potential Projects	Schedule <sup>1</sup>
<b>Forest-Wide Sustainability</b>	1) Reduce fuel loading and stocking levels in dense successional advanced dry forest stands where they exist between the Shady Pass and Lucerne LSRs..	1) Potential projects are limited due to the wilderness land allocation for this area. Prescribed Natural Fire is the only potential option for reducing fuels. This is likely to be unrealistic due to the nature of the fuels.	
<b>Forest-Wide Spotted owl</b>	Not Applicable. (This LSR is not one of the 3 LSRs on the forest designated as a source population area.)	Not Applicable.	
<b>Forest-Wide Connectivity</b>	1) Promote the development of fire climax stands within the dry forest vegetation group.	1) Thin from below favoring ponderosa pine.	A
<b>Unique Habitats &amp; Species</b>	1) Reduce road densities in riparian reserves associated with Railroad Creek and Domke Lake and in talus areas.	Close or relocate roads as opportunities are identified in Access and Travel Management Planning.	A
	2) Maintain existing subalpine meadows.	2) Remove encroaching conifers from meadows.	C
	3) Emphasize Domke Lake wetlands in management practices.	3) Amend the Forest Plan to designate a Special Interest area around the Domke Lake wetlands.	B
	4) Increase the amount of interior forest area within the LSR.	4) Close roads near interior forest areas as opportunities are identified through Access and Travel Management Planning.	A
	5) Retain whitebark pine acreage within the LSR.	5) Prescribed fire.	C

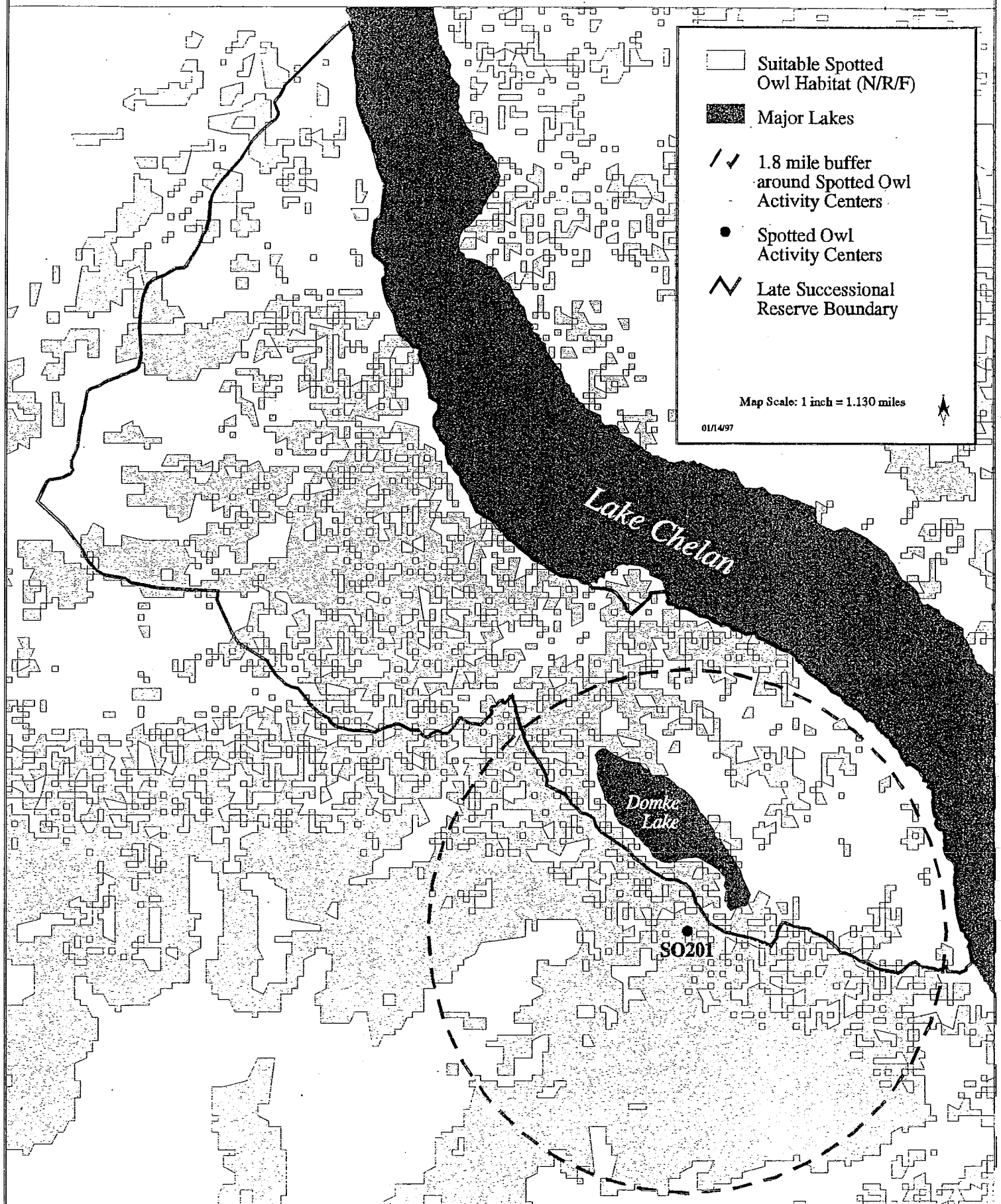
<b>Analysis Module</b>	<b>Restoration Opportunity</b>	<b>Potential Projects</b>	<b>Schedule<sup>1</sup></b>
<b>Connectivity Within the LSR</b>	1) Promote the development of fire climax stands within the dry forest vegetation group.	1) Thin from below favoring ponderosa pine. Use prescribed fire where current fuel loading permit the attainment of objectives.	A
	2) Increase the amount of interior forest area within the LSR.	2) Close roads near interior forest an in dry forest areas as opportunities are identified through Access and Travel Management Planning.	A
<b>Disturbance</b>	1) Reduce the risk of habitat loss to wildfire by reducing stand density, altering species composition and reducing vertical and horizontal fuel continuity in dry forest types.	1) Use commercial thinning, pruning, fuelwood collection and prescribed fire as described in disturbance module treatment key. Favor the development of seral species such as ponderosa pine. Priorities should be 1) Dispersal habitat. 2) NRF habitat within the LSR/MLSA but outside of owl circles, 3) NRF habitat within the owl circle on above threshold acres (Owl #201 is at threshold), 4) See item #2 under spotted owl for treatment of NRF habitat on threshold acres.	A
	2) Protect layered true fir forests from fire originating outside these types, primarily lower elevation dry forest types.	2) Use treatments described in #1 above in the adjacent dry forest types.	B
<b>Spotted Owl</b>	1) See Appendix 39, "Northern Spotted Owl Nest Site Protection Within LSRs and MLSAs"		A
	2) Improve sustainability of dense dry forest (vegetation Type 12) within 0.7 to 1.8 mile home range area on threshold acres. Treatment should maintain suitability of habitat for nesting, roosting and foraging. (see spotted owl desired conditions)	2) Utilize commercial thinning, pruning and fuelwood collection.	A

Analysis Module	Restoration Opportunity	Potential Projects	Schedule <sup>1</sup>
	3) Obtain information on spotted owl locations.	3) Survey areas to 1994 spotted owl protocol.	B
<b>Aquatic</b>	1) See late successional habitat implications in Aquatic section.	1) Coordinate projects with the Chelan Basin Watershed Assessment when it is completed.	C
<b>Noxious Weed</b>	1) Limit the extent and spread of <i>centaurea diffusa</i> currently found just outside of Lucerne LSR..	1) Consider treatments such as hand pulling and herbicides to limit extent and spread.	A
	2) Prevent invasion of <i>Crupina vulgaris</i> from the north shore of Lake Chelan into the Lucerne LSR.	2) Use combination of treatments that prevent spread of this weed into Lucerne.	B
	3) Increase knowledge regarding noxious weed presence in Lucerne LSR.	3) Survey LSR for presence of noxious weeds.	C
	4) Limit the extent and spread of millfoil in Domke Lake.	4) Consider treatments such as hand pulling and herbicides to limit extent and spread	A
<b>Fire Plan</b>	1) Protect LS values from loss due to wildfire	1) See fire plan for specific actions	

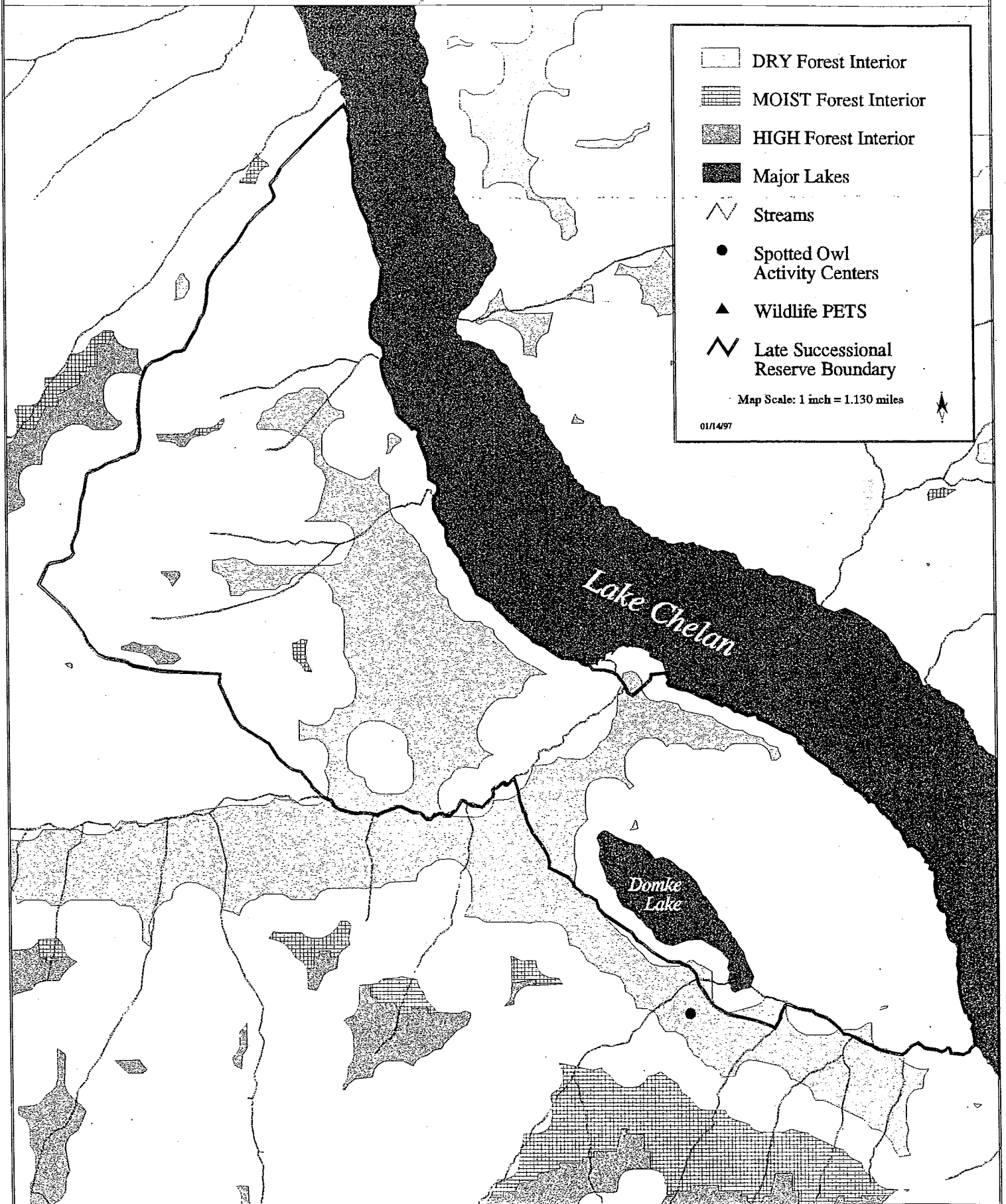
<sup>1</sup> Implementation Schedule; (A) = within 1 year; (B) = within 3 years; (C) = within 5 years

*Lucerne Late Successional Reserve*

# **SUITABLE SPOTTED OWL HABITAT**

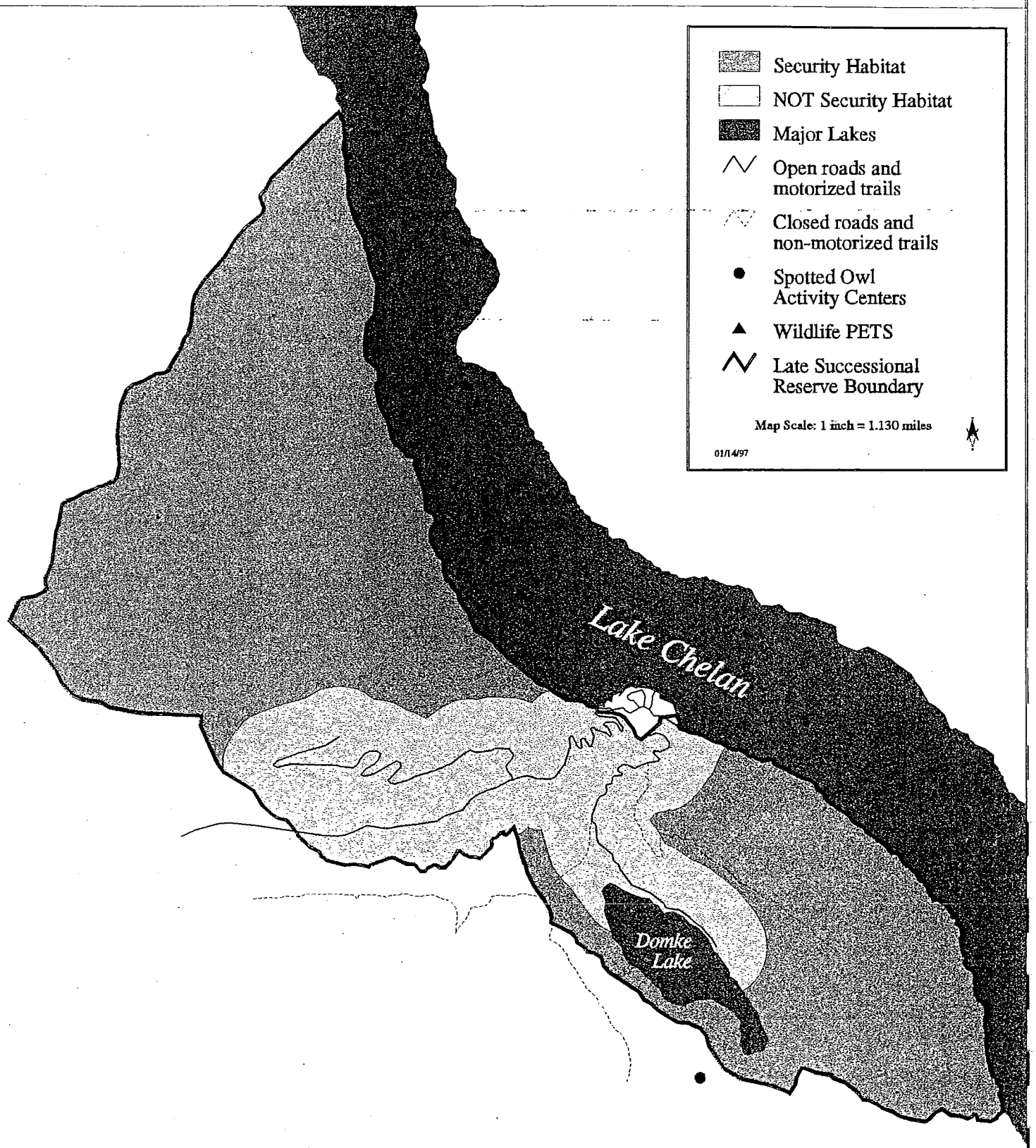


*Lucerne Late Successional Reserve*  
**FOREST INTERIOR**



# *Lucerne Late Successional Reserve*

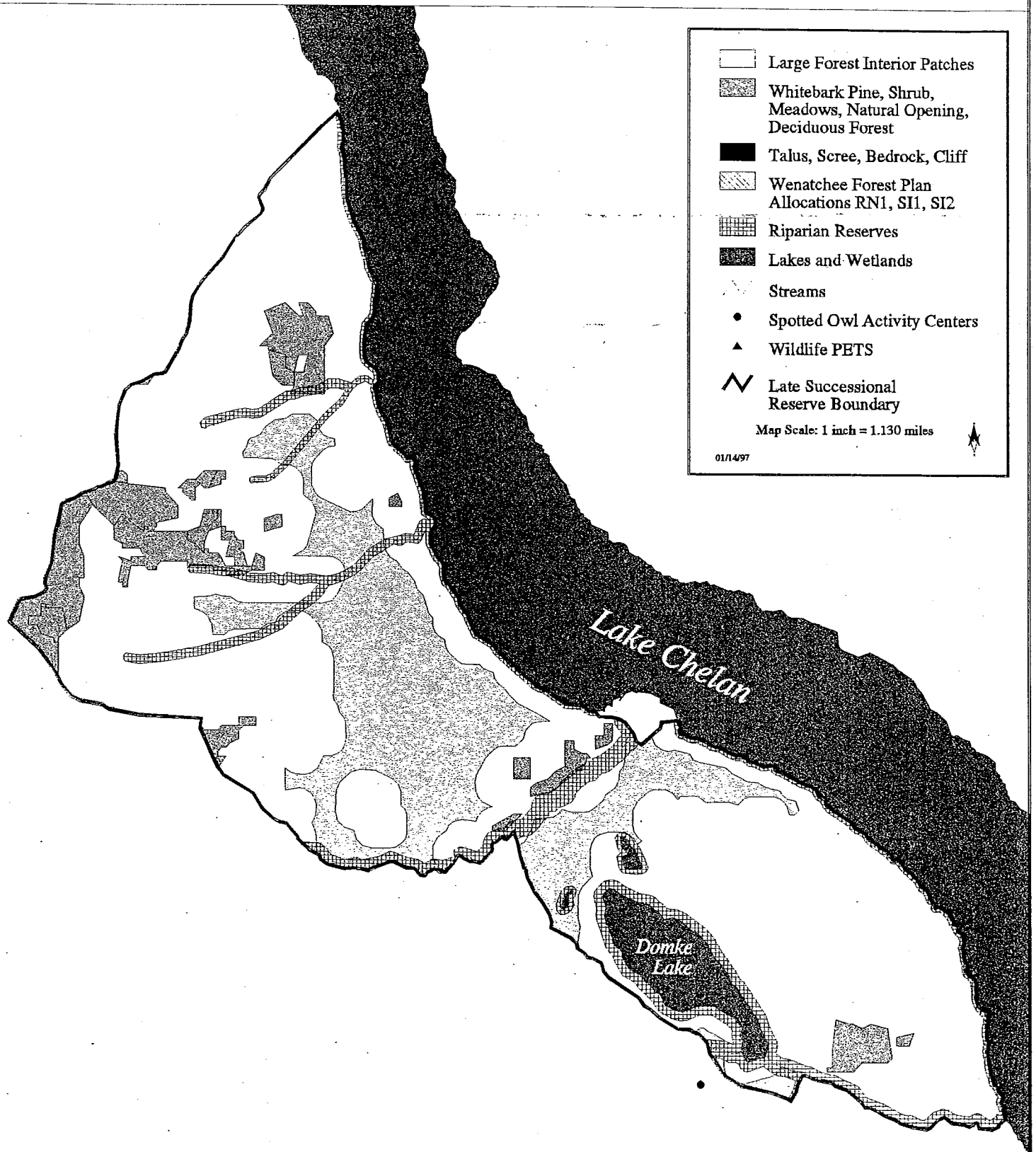
## **SECURITY HABITAT**





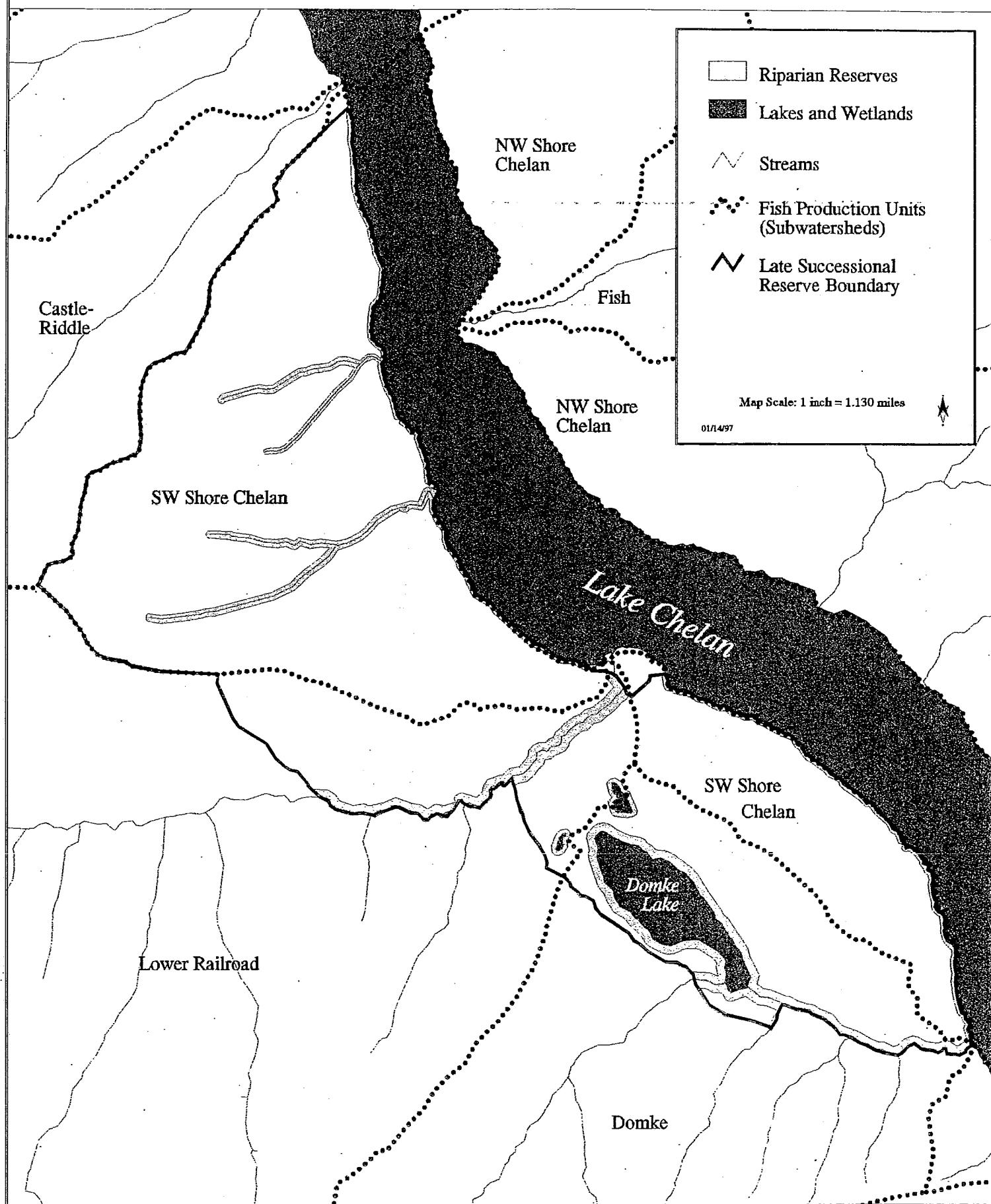
# Lucerne Late Successional Reserve

## UNIQUE HABITATS



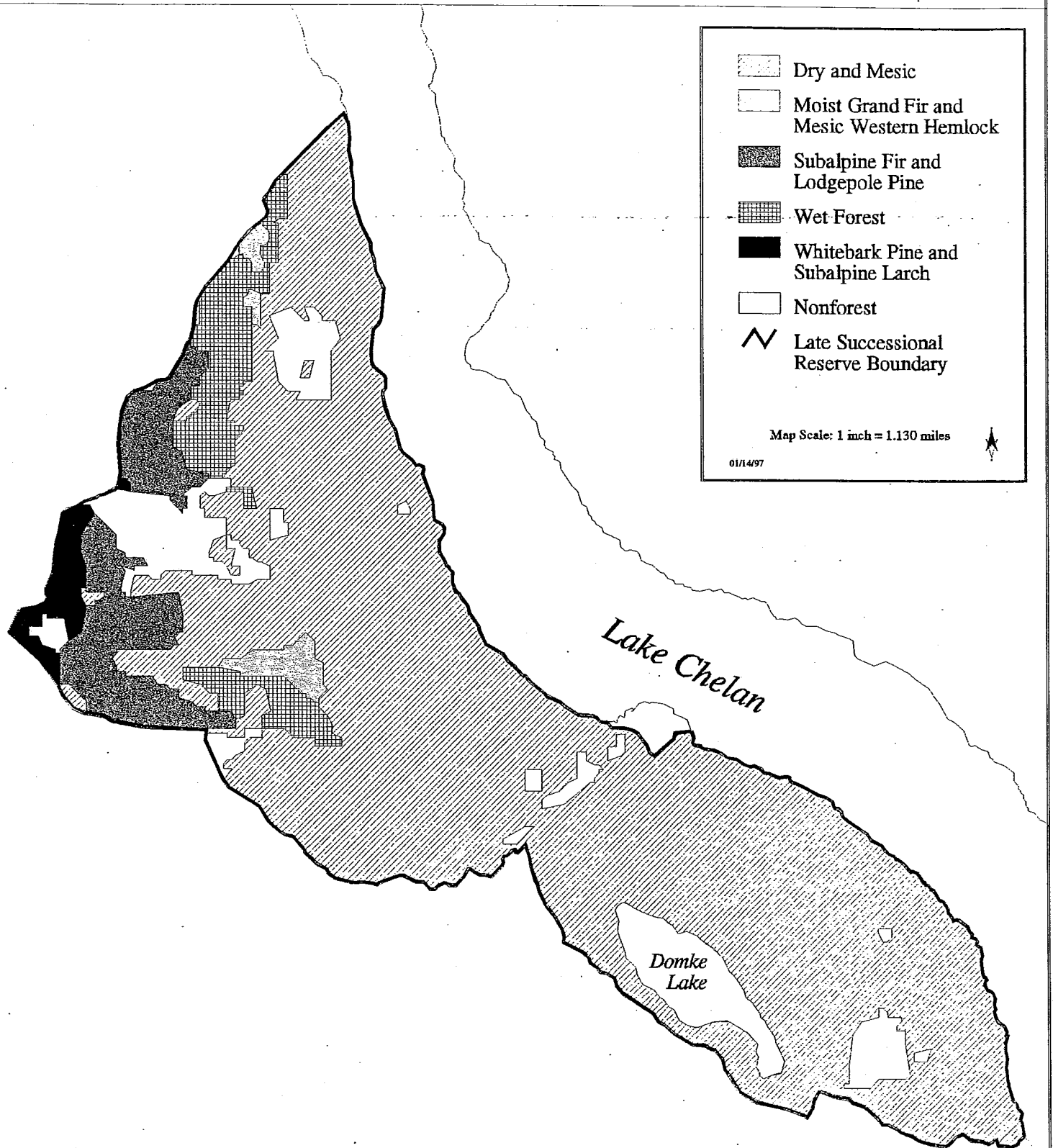
# *Lucerne Late Successional Reserve*

## ***FISH PRODUCTION UNITS (SUBWATERSHEDS)***



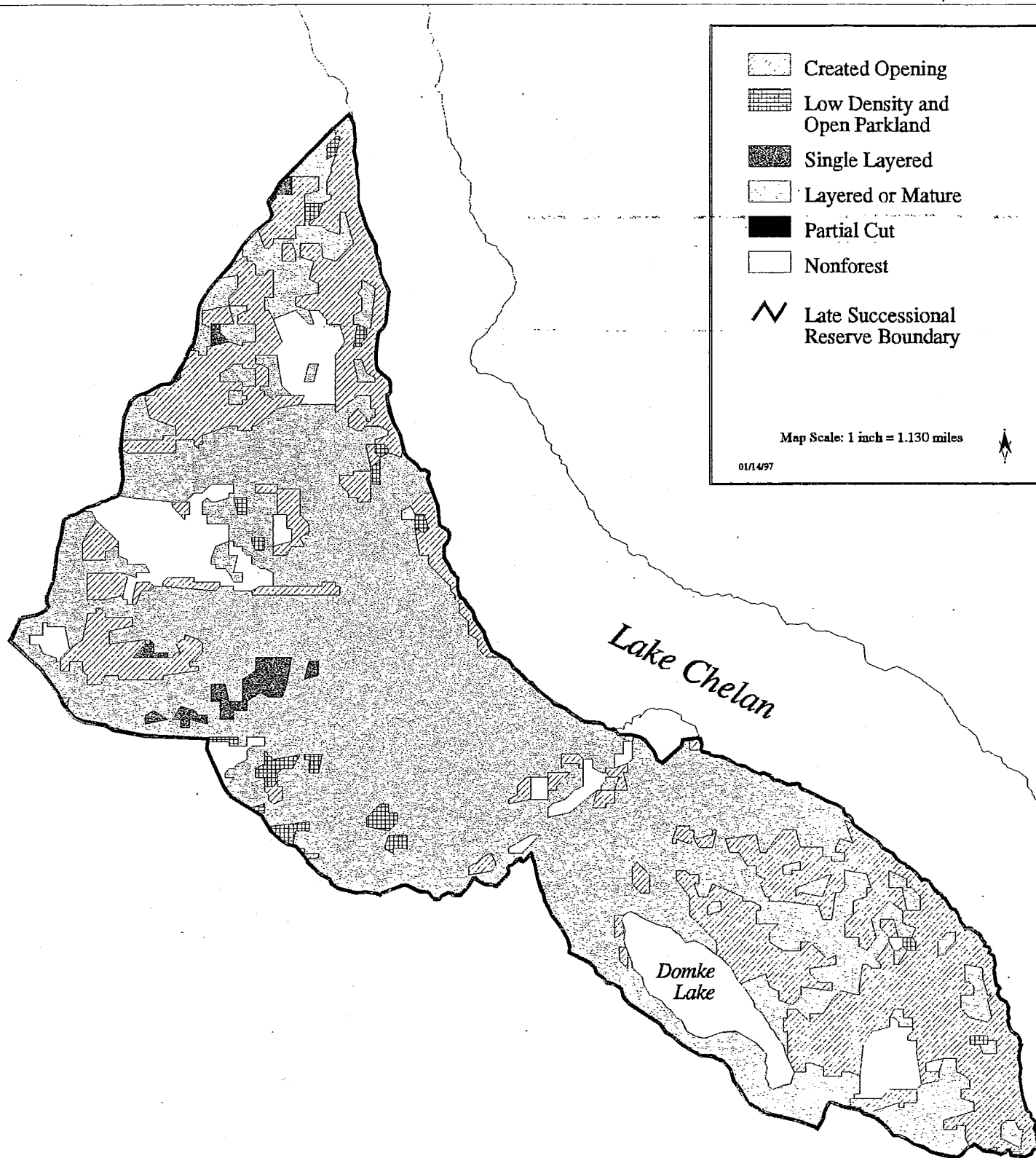
# *Lucerne Late Successional Reserve*

## **VEGETATION SERIES**

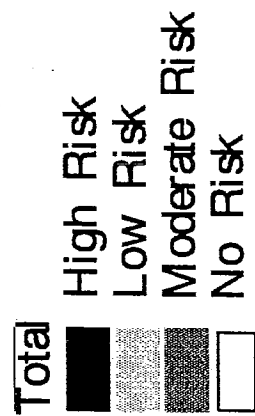
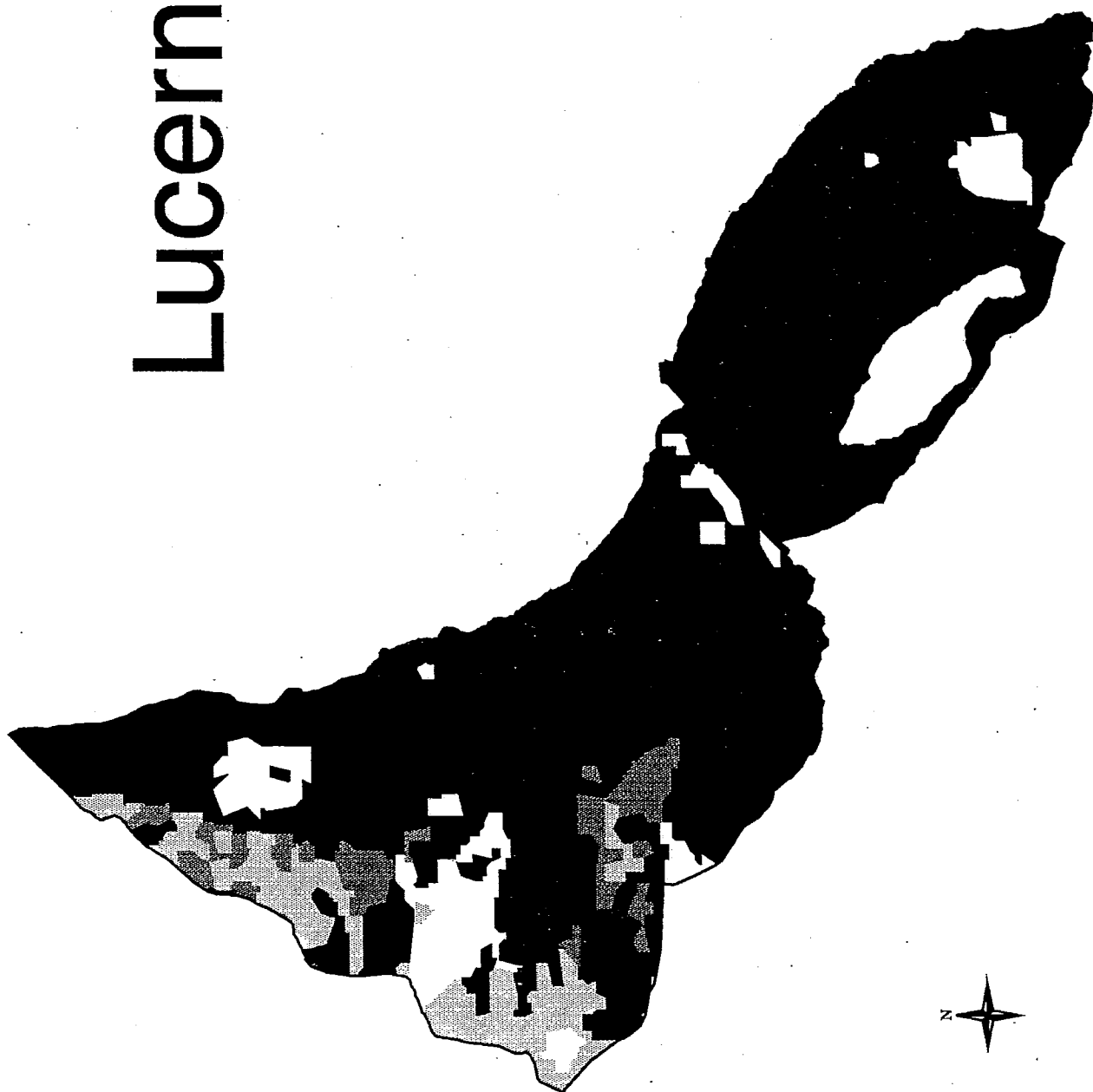


# *Lucerne Late Successional Reserve*

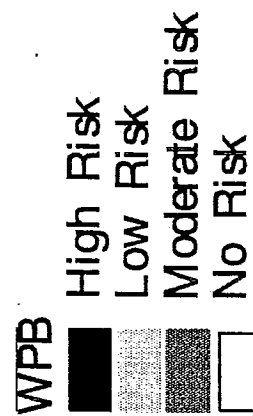
## **VEGETATION STRUCTURE**



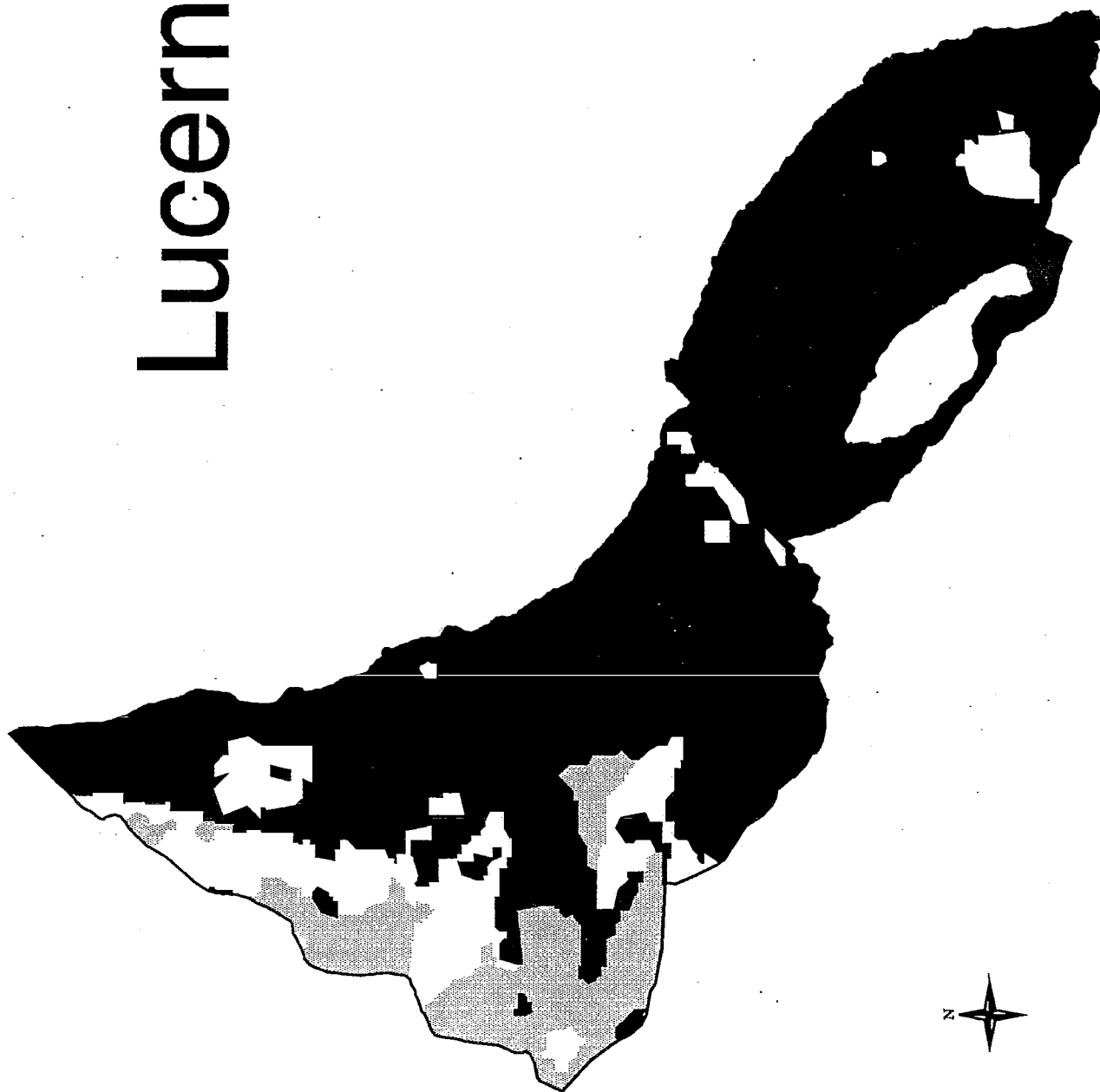
# Lucerne LSR



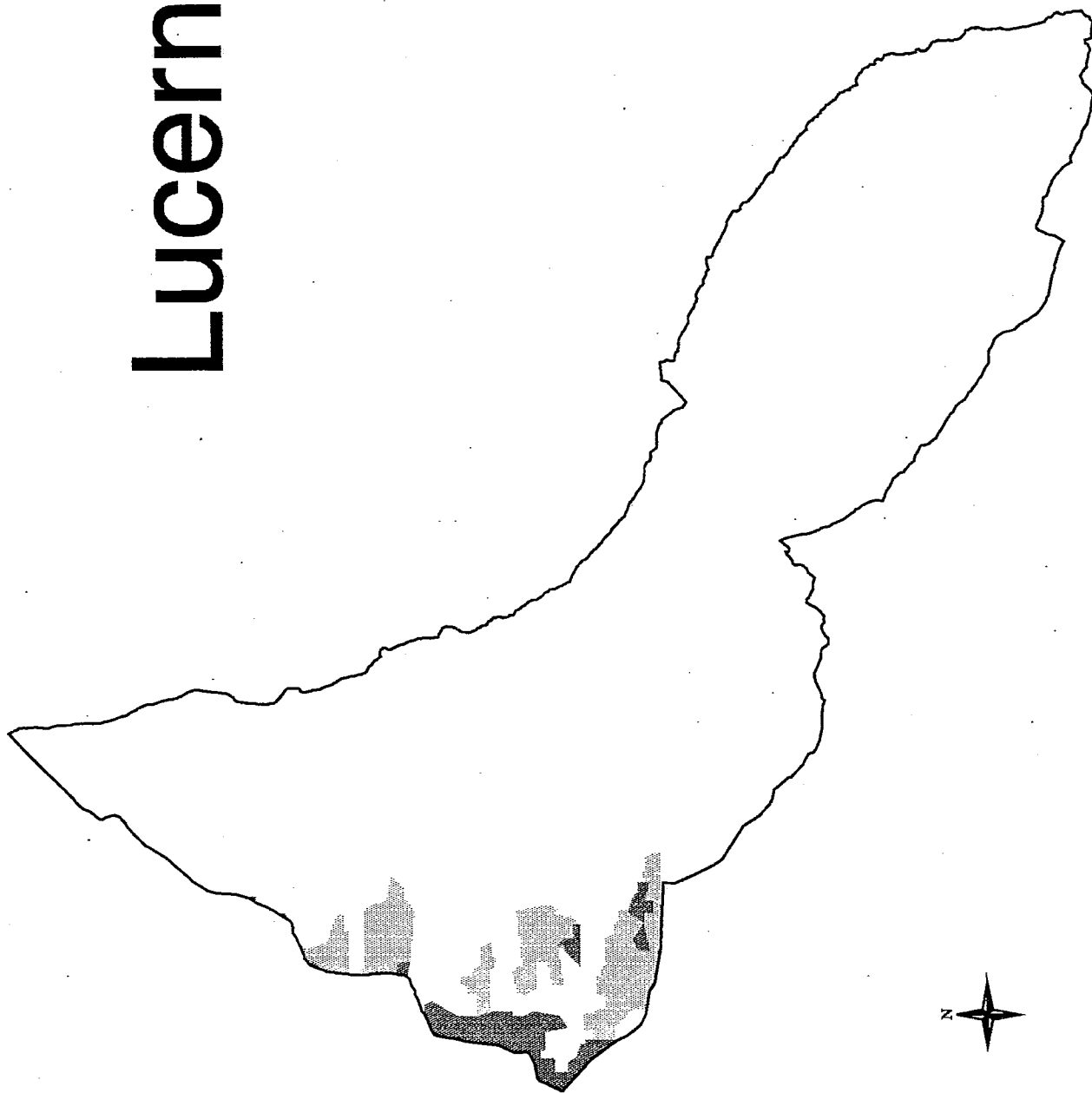
# Lucerne LSR



0.5 0 0.5 1 1.5 Miles



# Lucerne LSR



MPB

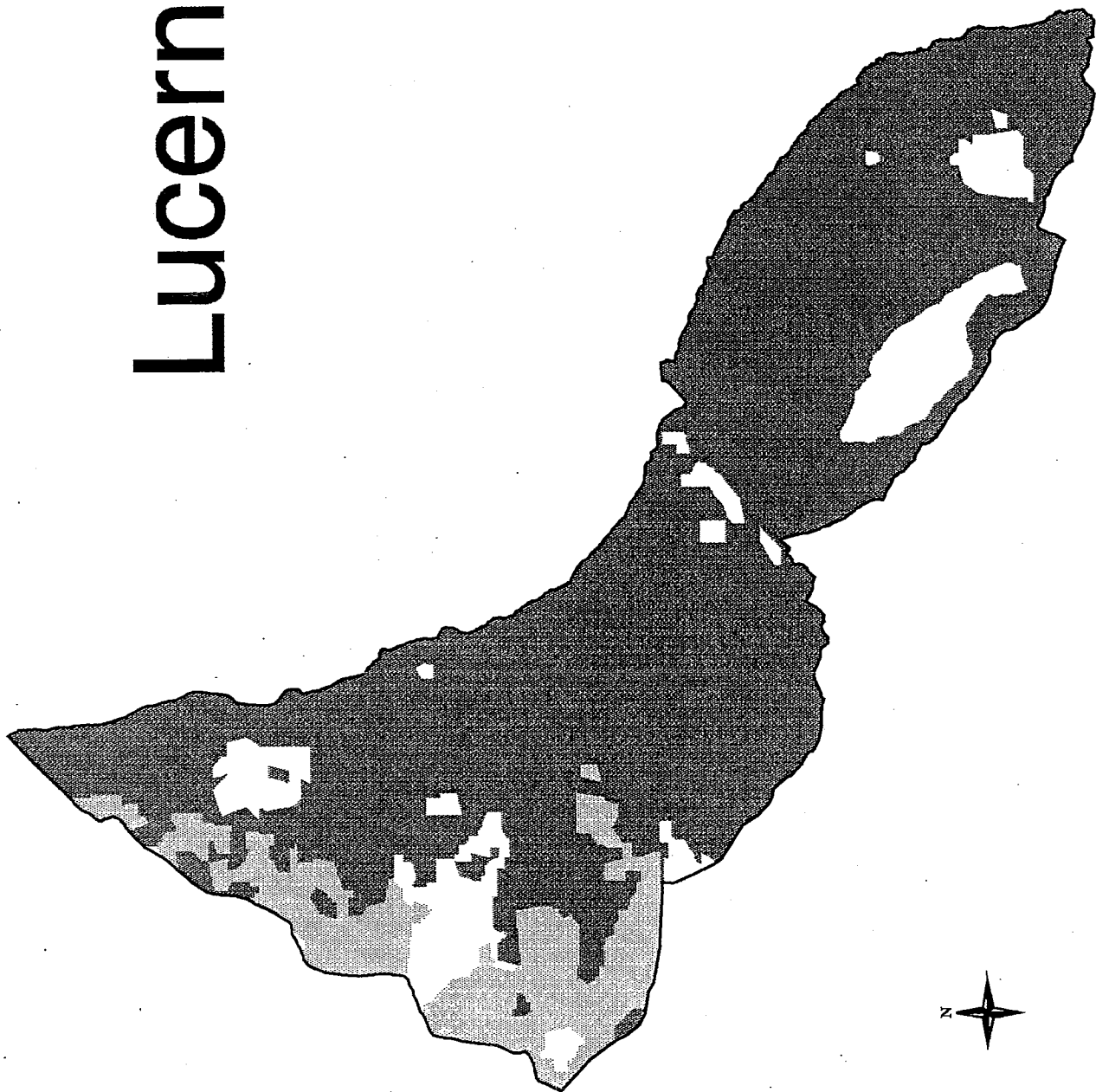
- High Risk
- Low Risk
- Moderate Risk
- No Risk



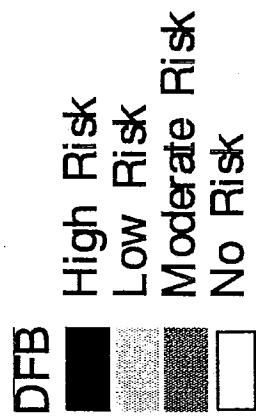
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# Lucerne LSR

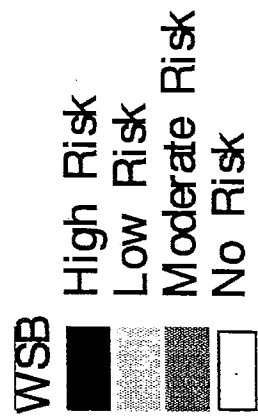
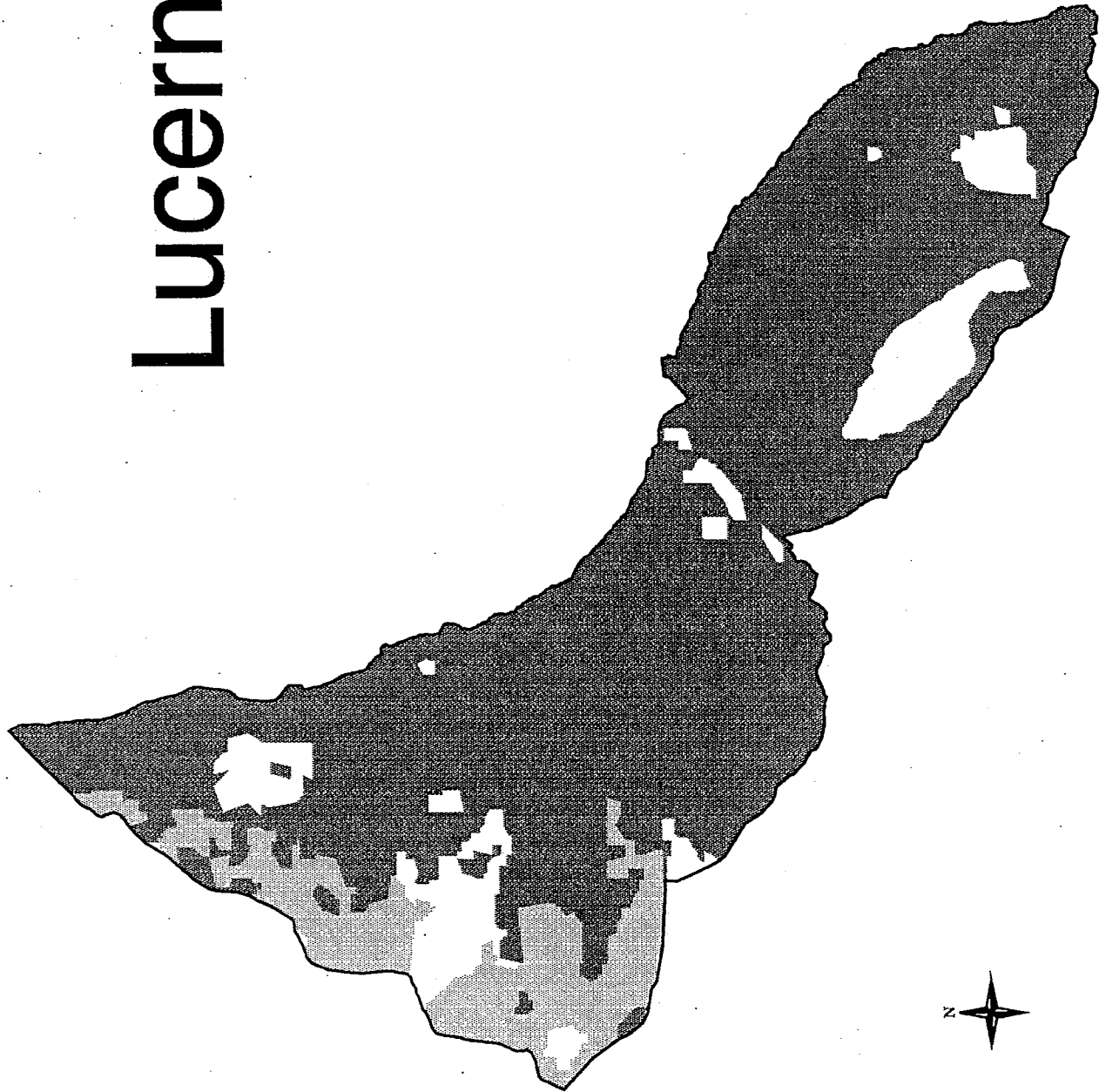


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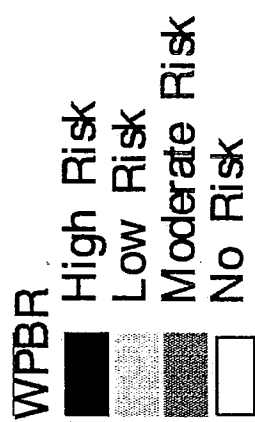
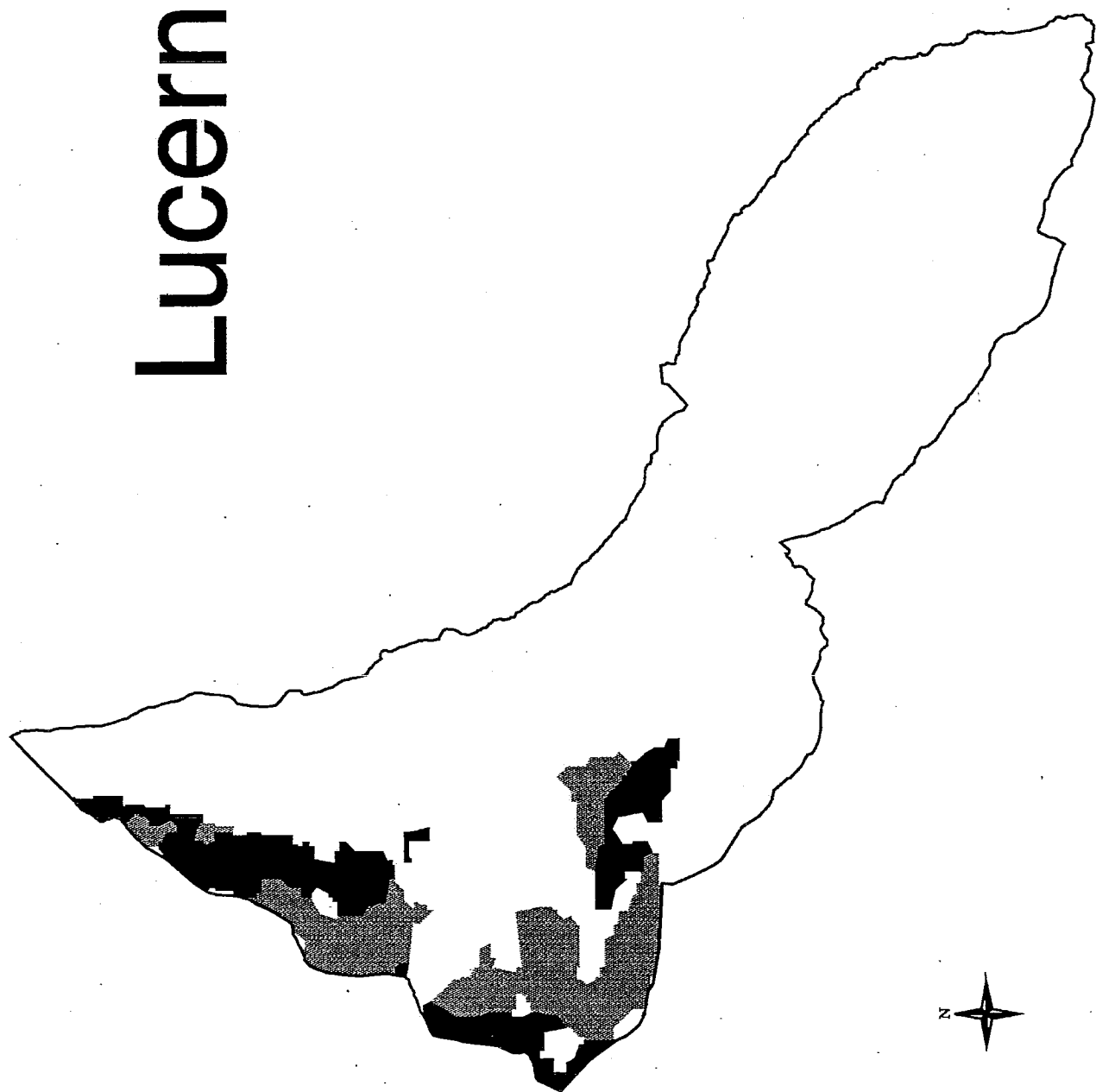




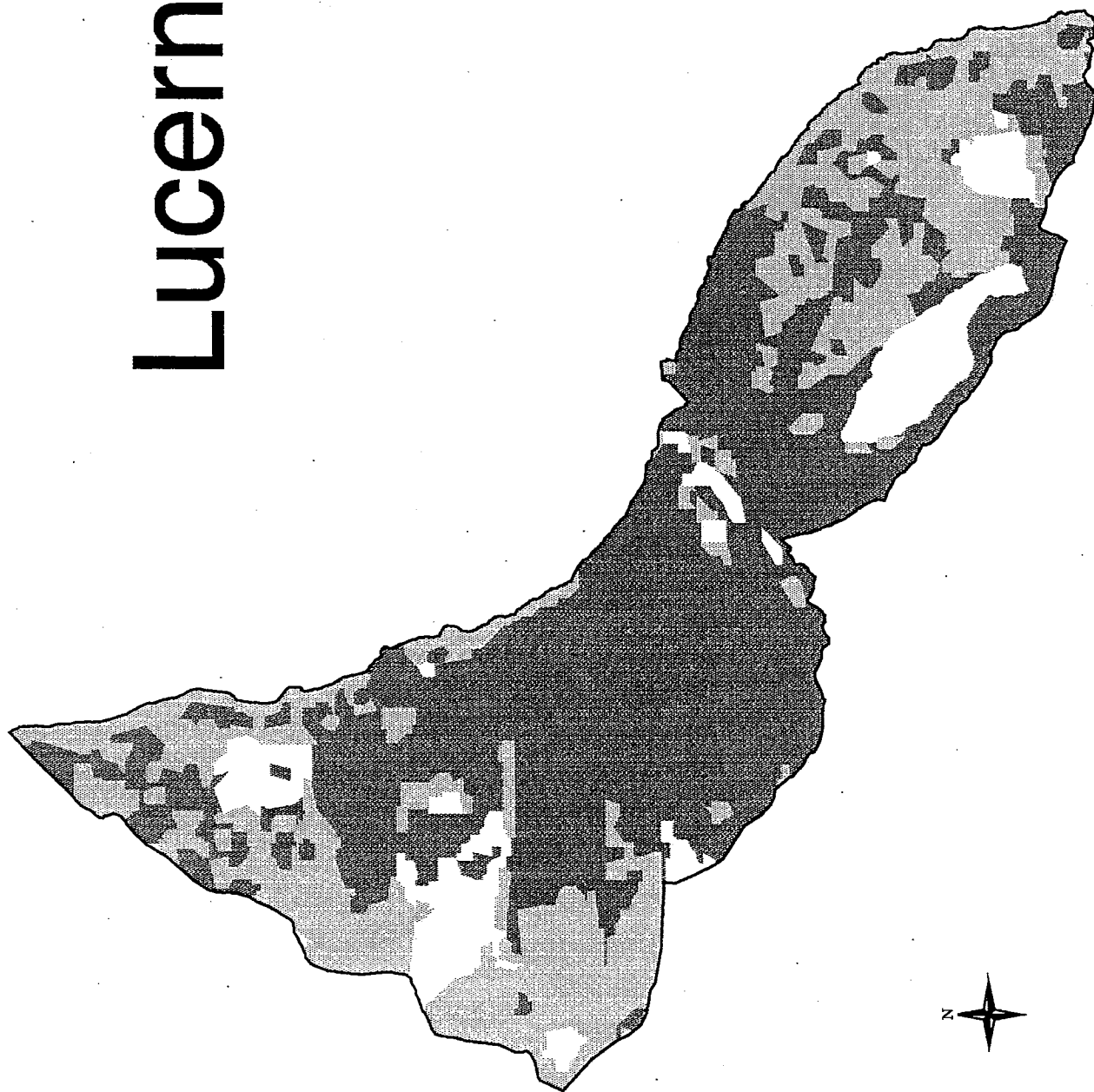
# Lucerne LSR



# Lucerne LSR



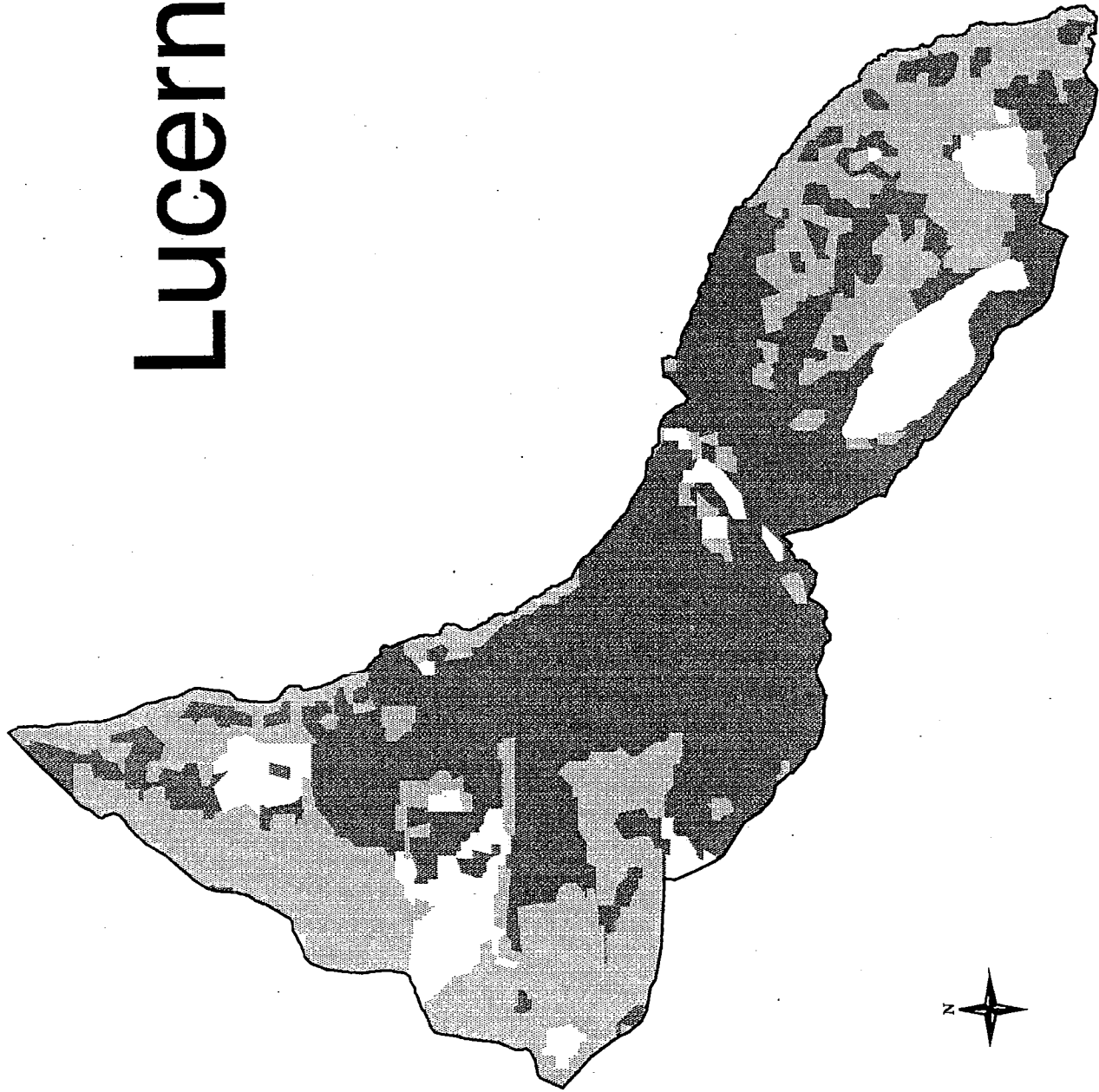
# Lucerne LSR



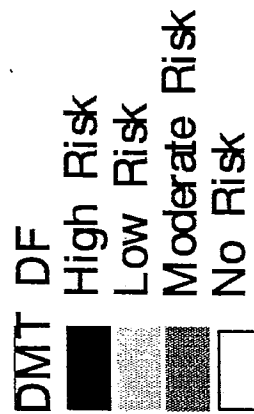
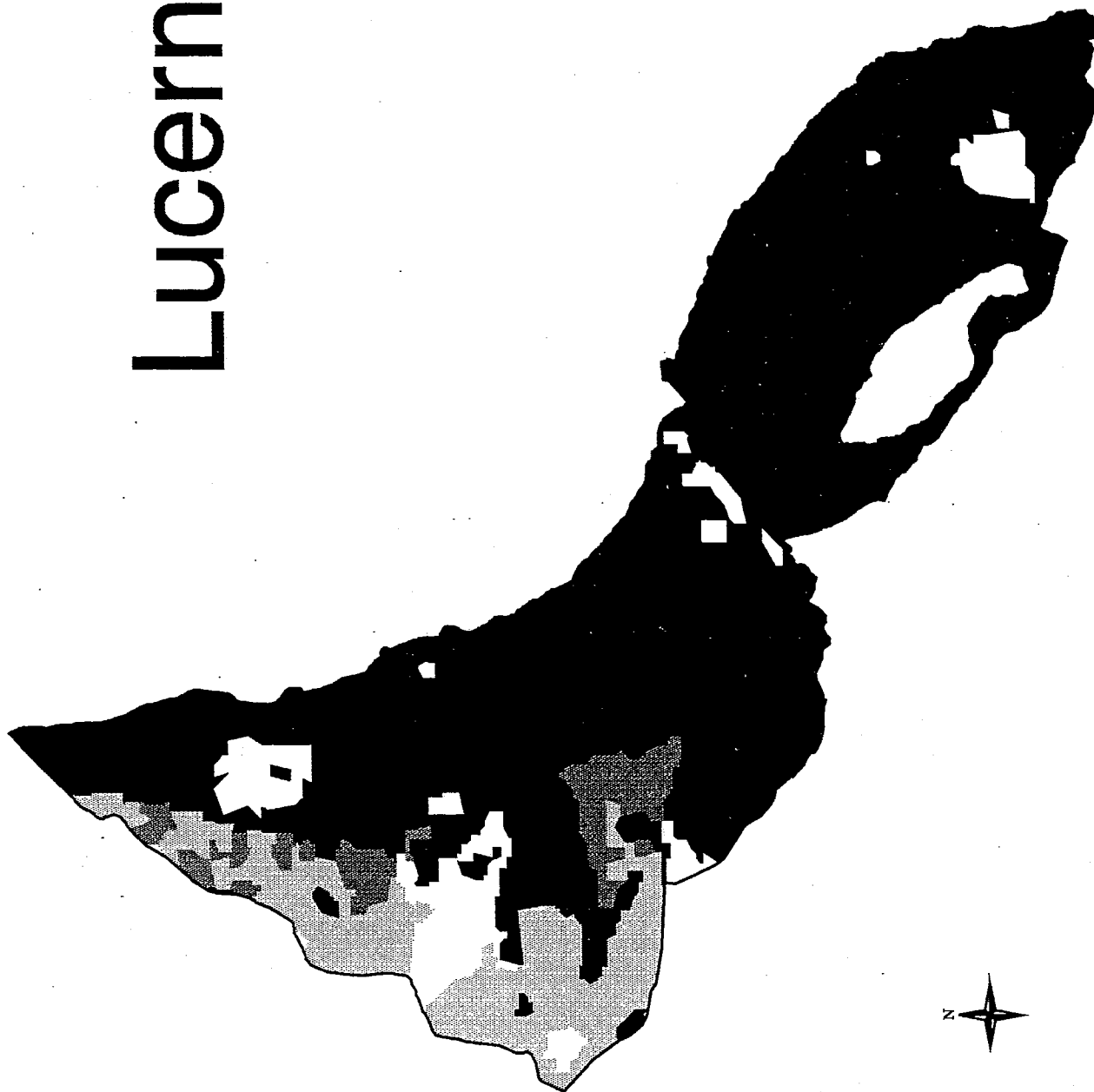
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# Lucerne LSR



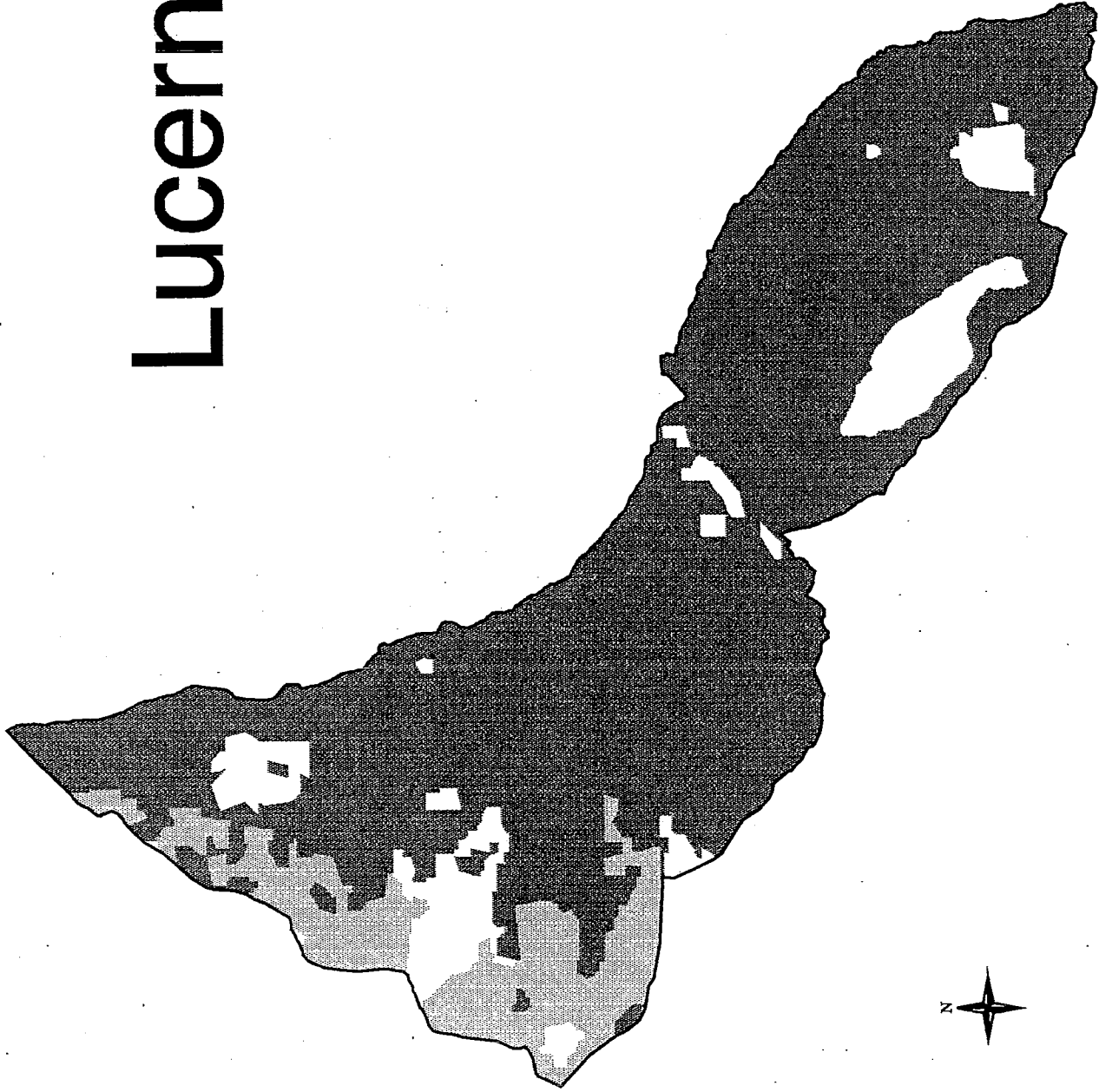
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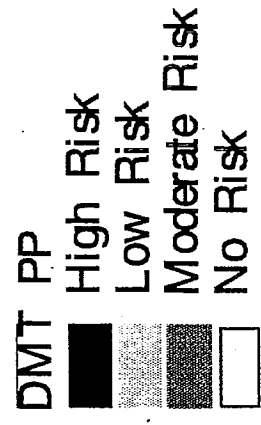
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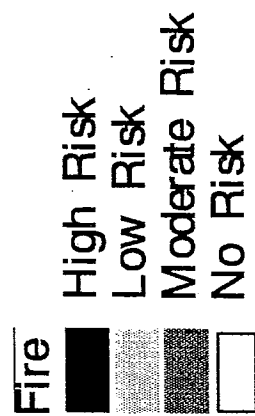
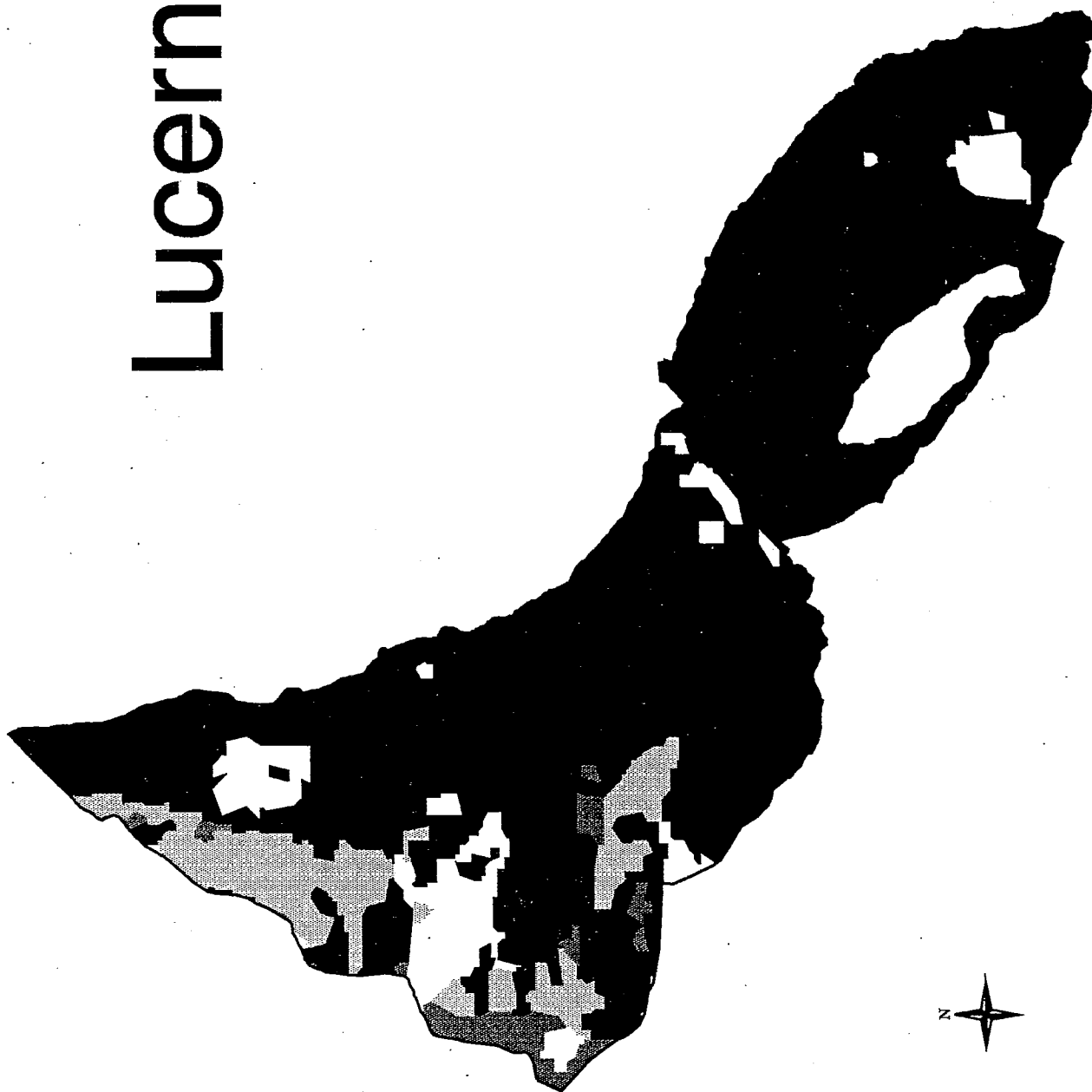
# Lucerne LSR



0.5 0 0.5 1 1.5 Miles



# Lucerne LSR



0.5 0 0.5 1 1.5 Miles



